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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

To the Members of the Western Gas Association—Gentlemen: The season is approaching for the collection of Wrinkles for the current year for presentation to the Western Gas Association at its coming meeting. All members and friends of the Association are reminded and invited to kindly forward, to the Wrinkle Editor as below, such ideas and devices as are suitable for this Department of the Association's work. F. H. SHELTON, No. 112 North Broad street, Philadelphia.

[OFFICIAL NOTICE.]

Seventeenth Annual Meeting, Ohio Gas Light Association.

OFFICE OF THE SECRETARY,
DELAWARE, OHIO, FEBRUARY 14, 1901.

The 17th annual meeting of the Ohio Gas Light Association will be held at Dayton, Ohio, March 20th and 21st, 1901.

The Hotel Beckel has been selected as the headquarters of the Association, and the business sessions will be conducted in assembly hall of the National Cash Register Company, one block distant from the Hotel.

The President, Mr. George Whysall, of Springfield, Ohio, will call the meeting to order on Wednesday, March 20th, at 9:30 A. M.

The following papers will be presented:

"Some Observations, Pessimistic and Otherwise;" by Mr. Charles R. Faben, Jr., Toledo, Ohio.

"Gas Pumping Stations;" by Mr. E. E. Eysenbach, Columbus, Ohio.

"Business Outside the Usual Channel;" by Mr. F. W. Stone, Ashtabula, Ohio.

"The Proportional Station Meter;" by Mr. George W. Barnes, Pittsburg, Pa.

"More about Concrete Tanks;" by Mr. C. W. Andrews, Hamilton, Ohio.

Two new attractions, which should prove most interesting, have been created for this meeting, viz.: A "Wrinkle Department;" edited by Mr. Henry L. Doherty, of Denver, Col.; and a "Novelty Advertising Department," edited by Mr. B. W. Perkins, of South Bend, Ind.

The Question Box will be given special consideration. Each member is requested to make contributions for it and send them to the Secretary not later than March 6th, so that they may be printed.

An opportunity will be given any of the speakers at the meeting to correct their remarks before leaving Dayton, but not after; as all the reports will be turned over to the printers immediately after the adjournment of the meeting.

The Hotel Beckel is conducted on the American plan and the rates for the meeting will be: $2.50 to $4 per day. The Beckel hopes to entertain nearly all of the Association, and will put forth every effort to make the members comfortable. Other hotels, the Phillips, Atlas and Algonquin, are within a block of the Beckel, and their rates are from $2 to $3 per day, American plan. The most satisfactory quarters are always obtained by writing in advance to the hotel people.

LIBRARY OF CONGRESS MAR 5 1901

The Secretary will furnish with pleasure application blanks for membership, and any further information which may be desired relative to the meeting. T. C. Jones, Secretary.

BRIEFLY TOLD.

Obituary Note, Mr. John S. Chambers.—We regret very much to have to chronicle the death of Mr. John S. Chambers, who passed away, at his home in Trenton, N. J., the morning of Saturday, Feb ruary 23d, after a short illness. Deceased had not been connected actively with the gas business since the absorption of the Trenton Gas Light Company by the Peoples Gas Improvement Company of Trenton, the first move towards which absorption was made in 1898. Twenty years prior to that, however, no other name ranked higher in the legitimate gas trading circles of the Middle States than did that of John S. Chambers. Born in Trenton, in 1823, his birthplace was the scene of his entire career. His education was completed in the Trenton Academy, and his graduation therefrom was followed by a period of 10 years spent in farming on the lands owned by his father. Meanwhile, Trenton was growing as a manufacturing center, and in time the farm lands were needed for building sites. The moneys thus acquired, stimulated the commercial spirit in Mr. Chambers, and some time after the organization (1847) of the Trenton Gas Light Company he became interested in its fortunes. This interest increased to such a point that in 1856 he was elected the Company's Treasurer. In the following year he was named a Director of the Company and later on was elected its Secretary as well. He served it faithfully and well in those positions for almost if not quite two score years, and when the new proprietors took possession the necessary changes in the management were made with every deference to the man in the Company whose stewardship of its affairs was at an end. Mr. Chambers represented the Trenton Gas Light Company on the occasion of the second meeting of the American Gas Light Association (New York, October 15 and 16, 1873), but his affiliation therewith was never prominent; in fact, he resigned membership therein several years ago. It would require very extended mention even to recapitulate the many and varied phases of his career in the city for whose advancement he accomplished so much, whence the general statement that he was actively and successfully concerned in everything that made for its welfare must suffice. Nor is such generalization in any sense too broad, as the religious, charitable, civic, commercial and social records of Trenton show, for well over half a century. He was a man of singularly pleasing personal temperament and ways. He is survived by his wife and two sons. The funeral services were held in his late residence, the afternoon of Wednesday, February 27th, the Revs. D. R. Foster and G. H. Ingram officiating. Interment was made in Ewing Cemetery.

The Wisconsin Gas Association.—A trifle belated is the information that here announces the formation of the Wisconsin Gas Association, the organization of which was perfected in the Hotel Racine, Racine, Wis., February 15th. The call was put forth mainly through the instrumentality of Mr. Henry H. Hyde, of Racine, who, by-the-way, has just stepped down from the Presidency of the Michigan Gas Association. The response to the call was quite gratifying, several of the Wisconsin Gas Companies being represented by delegates duly and thoroughly qualified to speak in a binding way. The constitution of the Michigan Gas Association, with but trifling amendment, was adopted as the guiding document of the Wisconsin youngster, and we regret to note that the dates fixed for the annual meetings are the first Wednesday and Thursday after February 10th of each year—the meetings of the Michigan Association are set for the third Wednesday and Thursday after the first Monday in February. The officers elected were:

President—Mr. George R. McMillan, Appleton, Wis.
Vice President—Mr. H. M. Buck, Waukesha, Wis.
Secretary and Treasurer—Mr. H. H. Hyde, Racine, Wis.

The next place of meeting is to be Madison. The meeting was quite harmonious, although the more one thinks of it the more regrettable it is that the organizers could not have selected some other fixed period for their meeting time.

Notes.—It must be a novel experience to the Murphy-Brady gas syndicate, of Albany and Troy, N.Y., to be confronted with real trouble in the shape of a bill seeking, one way or another, to cause a reduction in the gas rates for those cities.——We have it on fairly good authority that prices for gas oil, and other "crude stuffs" of that nature, are not likely to "go much beyond the present rates for some time to come."

[Official Report.—Revised by the Secretary.—Continued from Page 284.]

PROCEEDINGS, THIRTY-FIRST ANNUAL MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

Held at Young's Hotel, Boston, Mass., Feb. 19 and 20, 1901.

First Day, Feb. 19—Mobning Session.

Appointment of Committees on Memorials.

The President appointed the following committees on memorials to deceased members, with the understanding, if the reports could not be prepared in time for presentation to the meeting, owing to difficulty in promptly securing the relative facts, that the narrations could be subsequently spread upon the minutes, copies of the same being sent to the American Gas Light Journal and to the families of the deceased:

Hon. John M. Hill, Concord, N. H.—Messrs. George B. Neal and H. F. Coggeshall.

Mr. Henry A. Atwood, Plymouth, Mass.—Messrs. H. A. Allyn and W. A. Learned.

Mr. George T. Thompson, Denver, Col.—Messrs. Walton Clark and W. E. McKay.

Mr. Robt. R. Smith, New Hartford, Conn.—Messrs. C. H. Nettleton and F. C. Sherman.

Mr. Fritz H. Twitchell, Bath, Me.—Messrs. Jno. A. Coffin and E. H. Yorke.

Report of Secretary.

As Secretary Mr. Gifford reported that, to date of February, 1901, there were on the rolls 179 members, classified as follows: Honorary, 9; active, 133; associate, 37.

Report of Treasurer.

As Treasurer Mr. Gifford reported a receipt for the year of $896.50 an expenditure of $687.14, and a final balance of $1,059.43.

On motion the reports were accepted.

Reading the Correspondence.

The Secretary read several letters from members of the fraternity explaining why they could not attend the meeting, and wishing the Association further success along the line of the good work that it had instituted and was continuing.

Disposing the Hill Memento.

The President—Has the Secretary any further matter to bring to our attention?

The Secretary—Amongst the list of deceased members is the name of the Hon. John M. Hill, late of Concord, N. H. Mr. Hill, who, as you know, was was for many years a member of the Association and had its interests very much at heart, in his will bequeathed to the Association this inkstand, which was presented to him by the Directors of the Concord Company on the completion of 33 years' service with the Company. It is inscribed:

"Presented to John M. Hill, of Concord Gas Light Company, January 1st, 1889, in token of recognition of 33 years' faithful service in the management of the affairs of the corporation."

On the death of Mr. Hill his son wrote me of the presentation. I asked him if he would keep the token until the time of the meeting and send it down. It is here for your inspection and action.

The President—Gentlemen, I should like to hear from you in regard to the disposition to be made of the gift.

Mr. Lamson—I move that the Association accept the gift with thanks, and that we officially convey our acceptance in an appropriate way.

Captain White—Mr. President, in seconding the motion I desire to say that, while this Association necessarily appreciates the intention of our deceased old member in presenting to us this token, which must have been a gracious one to him when received from his Directors, yet I feel that as the Association has no proper place in which to keep it where it could be seen by our members, and it being well known to the Directors of our Association that the family does esteem it highly as a relic, and as an evidence of the high appreciation in which the Concord Company held our friend associate, I, therefore, in seconding the motion to accept from his executors this inkstand, would move to amend the motion to say that we return, together with our thanks for it, this gift to the family. Feeling that as we have no proper place in which to protect it, and recognizing that, as a family relic, it would have great value to them, this Association desires that the family should retain this evidence of the appreciation by his Directors of a

lifetime well spent in the service of his Company. I presume the proposer will permit me, in seconding his motion, to add to it in that way. Accepting in becoming and fitting terms this gift, acknowledging that it has duly reached the Association, but, appreciating the fact that it is a family relic and one which they must necessarily value highly, the Association, with its compliments, returns it to them as its best custodian.

Mr. Lamson accepted the suggestion conveyed in the seconding of Capt. White, and the President inquired as to the further sentiment of the Association in the premises.

Col. F. S. Benson—Would it not add to the value of the gift to the family if an amendment like this to Capt. White's suggestion prevailed. I move that an amendment thereto, providing that a suitable inscription in addition to the one now there be placed on the inkstand, showing that it was accepted by the Association and returned as a mark of our esteem to the family.

The motion, as amended by Capt. White and Col. Benson, was adopted, and the Secretary was instructed to act in accordance therewith.

The President called for the

Report of the Committee on Electrolysis.

Mr. Prichard, of the Committee, in responding to the call, said the Committee had no special report to make at the time. There had been no particular development over the matter in the interim.

At the suggestion of the President, in view of the fact that matters might develop in the current year, the Committee was continued.

Appointment of Committee on Nominations.

The President appointed as a Committee on Nominations, Messrs. C. F. Prichard, S. J. Fowler and F. C. Sherman.

ROLL CALL.

The following members responded to the roll call :

Honorary Members.

Benson, Col. F. S., Brooklyn, E.D., N. Y.
White, Capt. W. H., New York City.

Active Members.

Addicks, W. R., Boston, Mass.
Alden, G. A., Watertown, Mass.
Allen, B. J., Allston, Mass.
Allyn, H.A., East Cambridge, Mass.
Anderson, W., East Boston, Mass.
Barnum, D. D., Worcester, Mass.
Bartlett, L., Cottage City, Mass.
Clark, W., Philadelphia, Pa.
Coffin, J. A., Gloucester, Mass.
Coggeshall, H. F., Fitchburg, Mass.
Cook, R. W., Peekskill, N. Y.
Cowperthwaite, G. E., Danbury, Conn.
Crafts, H. C., Northampton, Mass.
Dickens, J., Newburyport, Mass.
Fowler, S. J., Springfield, Mass.
Frost, C. T., Plymouth, Mass.
Gifford, N.W., New Bedford, Mass.
Gould, J. A., Boston, Mass.
Goulding, N. O., Natick, Mass.
Hassett, E. J., Beverly, Mass.
Hintze, T. H., Malden, Mass.
Hirt, L. J., Everett, Mass.
Humphreys, C. J. R., Lawrence, Mass.
Humphreys, J. J., Jr., Worcester, Mass.
Jenks, Z. M., Woonsocket, R. I.
Jennings, F. W., South Framingham, Mass.
Lamson, C. D., Worcester, Mass.
Lane, H. M., Leominster, Mass.
Lawrence, W. F., Flushing, N. Y.
Leach, H. B., Taunton, Mass.
Learned, E. C., New Britain, Conn.
Learned, W. A., Newton, Mass.
Learned, C. A., Meriden, Conn.
Lucey, F. J., Natick, Mass.
Macmun, G. F., Marlboro, Mass.
Manchester, G. L., Easthampton, Mass.
Mansfield, G. W., Salem, Mass.
McKay, W. E., Boston, Mass.
Miller, C., Newark, N. J.
Milne, J. D., Norwalk, Conn.
Mooney, E. B., Brockton, Mass
Morrison, H. K., Concord, N. H.
Moynahan, J. F., Stoneham, Mass.
Neal, G. B., Charlestown, Mass.
Nettleton, C. H., Derby, Conn.
Norton, H. A., Boston, Mass.
Norton, W. F., Nashua, N. H.
Norton, P. T., Nashua, N. H.
Nute, J. E., Fall River, Mass.
Nutting, C. H., Chicopee, Mass.
Parker, F. H., Burlington, Vt.
Prichard, C. F., Lynn, Mass.
Richardson, F. S., North Adams, Mass.
Rossman, G. M., Keene, N. H.
Sargent, F. H., Lawrence, Mass.
Shelton, F. H., Philadelphia, Pa.
Sherman, F.C., New Haven, Conn.
Sherman, C. D., New Haven, Conn.
Slater, A. B., Jr., Providence, R. I.
Snow, W. H., Holyoke, Mass.
Spaulding, C. F., Waltham, Mass.
Spaulding, W. H., Westerly, R. I.
Stearns, W. M., Waltham, Mass.
Stratton, W. K., Haverhill, Mass.
Thayer, W. F., Clinton, Mass.
Tilton, D. D , Newburyport, Mass.
Todd, J. R., Walnut Hill, Mass.
White, C. E., Wakefield, Mass.
Wood, W. A., Boston, Mass.
Woodward, R., New Rochelle, N.Y.

Associate Members.

Allen, W. S., New Bedford, Mass.
Barnes, A. M., Cambridge, Mass.
Browne, A. P., Boston, Mass.
Cheney, H. N., Boston, Mass.
Cortis, D. T., Boston, Mass.
Davis, F. J., Waltham, Mass.
Dunbar, A., Brookline, Mass.
Fishe, J. T., Concord, N. H.
Holmes, R. E., Winsted, Conn.
Langwith, F.A., New Haven, Conn.
Mace, F. W., Lynn, Mass.
Macmun, G.F., Jr., Marlboro, Mass.
Norton, A. E., Boston, Mass.
Scranton, G. H., Derby, Conn.
Sprague, P. W., Boston, Mass.
Thomas, F. W., Boston, Mass.
Tufts, J. P., Boston, Mass.
Waldo, C. S., Boston, Mass.
Waldo, J. A., Boston, Mass.
Wardwell, W. R., Boston, Mass.
Walke, W. L., Fitchburg, Mass.

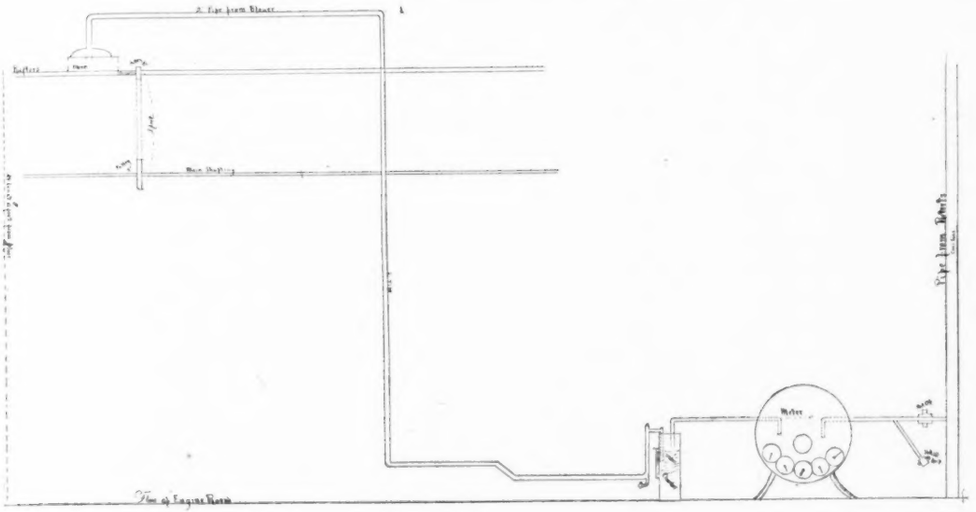
The President announced that the next business in order was the reading of the papers, and introduced Mr. S. J. Fowler, of Springfield, Mass., who read the following

REMARKS ON GAS PURIFICATION.

The city of Springfield is built in a half-circle, bounded on the west by a broad river which forms the chord ot the arc. The gas works are situated almost in the middle of this diameter, and as they are very near the principal business streets of the city, it is consequently desirable that there shall be as little offensive odor from them as possible. Most of our trouble has come from purifying material which, whether lime or iron mass, had to be shovelled over or carted through the streets. At the same time purification cannot be neglected, for the laws of the State of Massachusetts allow no sulphuretted hydrogen in gas as sent out, and but 20 grains per 100 cubic feet of total sulphur in other forms.

Up to October 31, 1895, the purifiers had been run with lime exclusively. They were four in number, each 10 feet by 16 feet, and about 3 feet deep. On the above date these boxes were abandoned and others put into use, 20 feet x 32 feet, and 3 feet, 6 inches deep, which were each filled with about 1,000 bushels of iron mass, containing 15 pounds of metallic cast iron borings to the bushel of sawdust. The comparative expense of purification, with lime in the old boxes and with iron mass in the new ones, is as follows: From July 1, 1890, to October 31, 1895, there were made 499,506,000 cubic feet of gas, and the expense for lime and labor was $9,972.77, or $19.96 per million cubic feet. From October 31, 1895, to July 1, 1900, there were made 653,184,000 cubic feet, and the total expense was $2,050, or $3.14 per 1,000,000 feet, which is a difference of $16.82 per 1,000,000, or, on the total quantity of 653,184,000 cubic feet, a saving of $10,958. But as the first 5,000 bushels of oxide became loaded with sulphur, and as the annual make increased, it was necessary to change boxes oftener, and sometimes when the wind would carry the smell into the city. I, therefore, proposed to introduce air into the gas to help on purification. Before attempting to make any change I, of course, brought up the subject before the Guild of Gas Managers, and, after receiving the usual amount of contradictory information and advice, resolved to put in the necessary machinery. The plan shows what was evolved. A small pressure blower was belted to the counter-shaft running the exhauster, and the air was led through a seal pot and a wet meter to the spot in the machine room nearest the hydraulic main, where the temperature of the gas is about 120° F. We introduce from 1 to 1½ per cent. of air. The gas is not cooled thoroughly, as, owing to local conditions, we do not save ammonia, and is passed through the scrubber and purifiers at about 80°. This apparatus was put in operation March 18, 1900, five days after we had made a change of purifiers. Since then, up to January 1, we have made 5 changes.

I propose to describe the contents of the boxes, give the reasons for changes, what we found, and how the boxes ran. The first box was charged with material containing 15 pounds of cast iron borings to the bushel of sawdust, which material had been used twice and had purified about 16,500,000. This layer was a little over 2 feet deep. Below this was a layer, 4 inches deep, of sawdust, which had been used several times, and which is intended to catch any tar. The second box was charged with like material, which had been used twice and had purified about 15,000,000. The bottom layer was the same as in number one. The third box was filled with new material, half shavings and half sawdust, with 15 pounds iron to the bushel. The lower layer was old and heavily charged iron mass. The fourth box was material which had been used and had purified about 12,000,000. The bottom layer was also old, and heavily charged oxide. The fifth box was the same as the third, except that the lower layer was fresh sawdust. I will here give a table of the changes and the quantity of gas made with quantity of air used.



Started March 15th.			Gas Made, Cu. Ft.	Air Used.
1st change,	July	26	51,725,000	350,050
2d	" Sept.	22	23,185,000	255,580
3d	" Nov.	27	37,478,000	468.250
4th	" Dec.	8	6,311,000	64,770
5th	" Dec.	21	8,652.000	138,810
Total			127,351,000	1,457,460

which is about 1.2 per cent. of the total.

The first two changes were made on account of back pressure alone, for the gas did not show foul through the first box. In each case the pressure was normal for some time, and then began to rise until at the exhauster it was about 20 inches on a make of 40,000 cubic feet per hour. As our seals are only 24 inches, it was judged better to change than to let the pressure run higher.

Some heating had been noticed in the boxes, and then the introduction of air was stopped for a day or two. On opening the boxes about half of the content was found to be so hard that it had to be loosened up with pickaxes, and afterwards the lumps had to be pounded to pieces on the turning floor; but it should be borne in mind that the first box had not been disturbed for more than 5 months and the second one for 7, so that the material had plenty of time to become hard, if it had any tendency that way.

When we started on the third combination of boxes we found immediately that the first box seemed to be doing no work. The oxide was new and did not seem to attack the sulphuretted hydrogen at all. However, we wanted to get it into shape and ran that combination until back pressure forced us to change once more. This time we found the stoppage in the old oxide in the lower layer. This, which had been undisturbed for 9 months, was very hard in some places and very tarry in others, so that the gas could not get through it. The next change was made on account of back pressure, for the same cause. The last change of the year was made on account of foul gas, the new oxide once more refusing to do good work. But the net result of the 10 months' running is that we purified 127 millions cubic feet with 5 changes, or 25,400,000 cubic feet to the box, whereas our usual quantity was 8,000,000 when we did not use air; or we have made 5 changes instead of 15. We are well contented with the result.

It was a queer coincidence that, on March 6, a fortnight before the blower was put in, but some time after it was ordered, the Mayor of Springfield appealed to the Board of Gas and Electric Light Commissioners for a reduction of the price of gas in Springfield. The hearing on the petition came on early in June, and one of the first points made by the petitioners was that a blower was in use, carefully concealed, by which 20 per cent. of air was added to the gas, and the Commissioners were urgently besought to go to the works and see the felonious machine. A discharged workman, who was a witness for the city, made the plan here shown you, and gave the Commission full details of the arrangements, though, as he is one of that class of men who believe and say that as much air will go through a half-closed stopcock as through an open one, his testimony had only corresponding weight. But the papers took up the matter in true journalistic style, placed it in headlines above their editorials, used it in paragraphs and even published pictures of the manager and the workman regulating the air supply. To one of a scientific turn of mind nothing could be more ridiculous, though I admit that the experience was extremely unpleasant to me personally. However, I have survived the infliction and am glad to relate my experience to my associates. I hope, now that the novelty of the thing has been taken away, we managers may use the common methods of economy without any unpleasant consequences.

Discussion.

The President—Gentlemen, Mr. Fowler's very interesting paper is before you for discussion, which I hope will be an extended one.

Mr. F. C. Sherman—Will Mr. Fowler state to us the dimensions of his boxes?

Mr. Fowler—20 by 32 feet, and the oxide lies in them 26 inches deep. Each box carries about 1,000 bushels.

Mr. W. A. Learned—What is your maximum hourly rate of flow?

Mr. Fowler—The maximum might be 45,000 feet, but the average is not much over 22,000 or 23,000. It might reach 30,000 in December and Jannary, but it is an irregular flow. During the day, or whenever we are making water gas, our flow of gas is much quicker than at other times.

Mr. Norris—Does Mr. Fowler find any difficulty in the use of a blower in getting a constant percentage of oxygen. That is, whether he finds that running his little oxygen blower from the same countershaft as the exhauster results in his getting into the gas a constant percentage of oxygen, even though the exhauster be run at different rates.

Mr. Fowler—It is rather difficult to keep it at a perfectly even percentage. The blower has a large clearage, and unless it is run at a fairly high speed it does not produce enough pressure to overcome the seal and the meter.

Mr. Norris—Personally I have found considerable trouble with the use of that form of oxygen pump, and we are drifting in the direction of a piston pump as answering the purpose better. In the second place, I would like to ask whether in measuring his oxygen he uses a wet or a dry meter.

Mr. Fowler—A wet meter.

Mr. Norris—Do you find any trouble from the rusting of the drum?

Mr. Fowler—It has not yet been in use long enough to give us any trouble in that way. It has been in service only since last March.

Mr. F. C. Sherman—It is a well established fact that the slower we pass our gas through the purifying material the better the results. A portion of the very excellent results which Mr. Fowler has obtained can be attributed to the very large size of his boxes as compared with the work which he is doing with them. Therefore, those of us who do not have large boxes for the business we are doing should not expect to get the results which he reports, and should not be discouraged if we cannot attain them.

Mr. Lamson moved a vote of thanks to Mr. Fowler.

Capt. McKay in seconding the motion thought they should congratulate Mr. Fowler on the progress reported by him in reducing the great cost of oxygen, for they all remembered how very much it cost when first brought forward by Mr. Brin.

The motion having been adopted, and the President having so announced, Mr. Allyn suggested that before the subject was finally passed, and that as he had heard several gentlemen inquiring in his neighborhood

whether Mr. Fowler was making all water gas or a mixture of water and coal gas, it might be pertinent to have that query answered.

Mr. Fowler—We made during that time probably about and certainly not more than 25 per cent. of water gas.

Mr. Walton Clark—I would like to say on this subject that I believe the use of oxygen, whether in the form of air or otherwise, in small percentages in the gas as an aid to purification, is beneficial alike to the gas company and the consumer. It results in a better quality of gas, less smell round the works and a somewhat reduced cost of gas.

The President—Gentlemen, we all thoroughly agree with Mr. Walton Clark in that statement. It is the general practice both here and abroad. It goes without saying. We will now listen to the paper by Mr. Carroll Miller, of Newark, N. J., on

THE PROPORTION OF SULPHUR REMOVED IN EACH PURIFYING BOX.

The object of the experiments described in this paper was to determine the proportional amount of sulphur in the form of sulphuretted hydrogen (H_2S) removed from the gas by the oxide of iron in each box in a set of four.

The apparatus used for determining the sulphur in the gas consists of a graduated burette of a capacity of about 112 cc. On the top of this burette is a 3 way cock, which establishes communication between the burette and a hose nipple, through which the gas is introduced, and between the burette and a cylindrical vessel, of about 10 cc. capacity, graduated to 1/10 cc. This graduate is situated on top of the 3-way cock. A cock is on the bottom of the burette for the purpose of introducing or ejecting the liquid used. The whole apparatus is made of glass.

The burette is first filled with starch water, then 100 cc. of the gas is introduced, thus displacing 100 cc. of the starch water and leaving about 12 cc. in the bottom of the burette. The 10 cc. graduate is filled with a standard solution of iodine in water. The 3 way cock is turned so that the solution gradually enters the burette. The iodine combines with the sulphuretted hydrogen to form hydriodic acid and the sulphur is set free. Thus $2I + H_2S = 2HI + S$.

When all the H_2S is decomposed, the starch water in the bottom is seen to turn blue, then the cock is shut off and the amount of the solution used is observed. The reason that the starch water turns blue is that when all the H_2S is decomposed, iodine drops into the starch water and, according to the well known chemical fact, the chemical reaction between the iodine and starch forms a blue solution. 1 cc. of the solution used in these tests indicated the presence of 100 gr. of sulphur per 100 cubic feet of gas.

This apparatus is designed so that the tests may readily be made in the purifying house. The possible error is as high as 15 grs. This does not materially alter the percentages found.

I am indebted to Mr. J. M. Ruegenberg, one of my assistants, for the able way in which he performed these experiments.

Tests were made daily in the coal gas for a period of about two months. Samples of gas were taken from the inlet of the first box and from the outlets of each of the four boxes.

I have selected at random a set of results for coal gas, taken between "changes."

Coal Gas.—Size of boxes 24 feet by 30 feet, with one layer of 30 inches of oxide in each box. Steam coils are in the bottom of each box. Throughout these tests the temperature was kept practically constant in each box, as follows: Outlet of first box, 84° F.; outlet of second, 78°; third, 70°, and last, 64°. No air was admitted into the gas.

TABLE I.—COAL GAS.—*Grains of Sulphur per* 100 *Feet of Gas.*

Day	Foul	Outlet of Box Nos. 1	2	3	4	Rate of Flow of Gas Per Hour.
0	462.5	132.5	20	0	462.5	.....
1	475	180	23	0	off	43,500 cubic feet.
2	465	205	22.5	0	"	42,500 "
3	490	280	45.5	0	0	42,500 "
4	672	333	73	10.5	0	36,000 "
5	620	337	122	10	0	42,500 "
6	421	284	83.5	11	0	45,000 "
7	430	292	85	16	0	45,000 "
8	435	307	92	17.5	0	43,500 "
9	423	off	112	16	0	43,000 "

Gas at the outlet of No. 3 discolored acetate of lead paper on the 7th day. The variation of sulphur contents of the foul gas is due to change of coal.

The method of running is to always have the gas passing through four boxes, except when it is necessary to refill one of them. Gas from the outlets of the first two boxes will discolor acetate of lead paper.

A day or two after the third one shows foul a change is made, thus having two clean boxes, except when one is being filled with oxide.

Table I. shows that the first box removed 43.8 per cent. of the sulphur between changes, and was still removing 29.4 per cent. (128 grains) when a change was necessary; the second box removed 41.8 per cent. between changes; the third box 11.8 per cent.; the fourth 1.6 per cent.

The averages of the tests made during the time between November 26, 1900, and January 26, 1901, give the following proportions:

TABLE II.

Sulphur removed in	first box.....	44.6 per cent.
" "	second box....	44.2 "
" "	third "	10.4 "
" "	fourth "	.8 "
		100.0

During that time seven changes were made, and in only one case did the first box show the same amount of sulphur at the inlet and outlet at the time of changing. The boxes then showed as follows:

Sulphur in foul gas		.....462.5 grs.
" at outlet of	first box	.....462.5 "
" " "	second box	.....132 5 "
" " "	third "	..... 20. "
" " "	fourth "	..... 0. "

The most sulphur that was being removed by the first box at the time of a change was 29.4 per cent. (128 grains), and the average for the seven changes was 18.3 per cent. (82.2 grs.)

The average rate of gas per hour for the two months was 46,700 feet; the highest 51,000 feet; the lowest 39,000 feet.

Unfortunately, at the present writing, no complete set of tests for the water gas boxes are available on account of their being only two changes made during the two months and the failure to make some tests. I will give in Table III. the results of tests which were taken but 13 consecutive tests, for as many days are missing.

Water Gas.—Size of boxes 30 feet by 36 feet, with one layer of 30 inches of oxide in each box. Steam coils are placed as in the coal gas boxes. The temperatures were as follows: Outlet of first box, 75° F.; outlet of second, 69°; outlet of third, 65°, and outlet of fourth, 62°. No air was admitted into the gas.

TABLE III.—WATER GAS.—*Grains of Sulphur per* 100 *Feet of Gas.*

Day.	Foul.	Outlet of Box Nos. 1	2	3	4	Rate of Flow of Gas Per Hour.
0	200	58	20	0	180	.....
1	194	70	22	0	off	98,000 cubic feet.
2	194	90	23	0	"	153,000 "
3	198	105	24	0	0	169,000 "
4	186	100	28	0	0	152,000 "
18	196	105	25	2	0	122,000 "
19	184	105	27	2	0	82,000 "
20	187	105	25	3	0	84,000 "
21	180	110	27	3	0	89,000 "
22	192	96	24	3	0	87,000 "
23	200	157	27	2	0	188,000 "
24	194	167	25	3	0	165,000 "
25	182	170	26	3	0	156,000 "
26	235	190	27	18	0	162,000 "
27	222	212	30	19	0	95,000 "
28	212	off	35	20	0	109,000 "

Gas at the outlet of No. 3 discolored acetate of lead paper on the 26th day. The variation in the sulphur contents of the foul gas is due to change of coke in the generators. The method of running is the same as in the coal gas.

Table III. shows that the first box removed 35.1 per cent. of the sulphur between changes, and was only removing 4.5 per cent. (10 grs.) when a change was necessary; the second removed 51.8 per cent.; the third 11 per cent., and the fourth 2.1 per cent. These percentages are misleading as the 13 tests are left out. No. 1 would show higher and No. 2 lower. I will not give the averages for the two months for the same reason as above.

From the above results it would seem that it is the best practice to pass the gas through four boxes.

Referring to Table I. If three boxes were on, and it was desired to have one clean box in the series, great care would necessarily have to be taken to get on the fourth box as soon as No. 3 showed foul. By this method, which seems rather risky, as much work could be gotten out of the first box as with four in the series.

If three boxes were on, and it was desired to have two clean boxes in the series, considering 2, 3 and 4 in Table I. to be the three boxes,

and the gas at the outlet of No. 1 to be the foul gas, No. 2 removed 75.4 per cent. of the sulphur between changes and was still removing (considering 307 grs. in the foul gas) 70.0 per cent. (215 grs.) when a change was necessary.

The second box removed 21.7 per cent. between changes; and the third 2.9 per cent. This case is in favor of the 3-box system, as the gas assumed as totally unpurified averages 55.3 per cent. (224 grs. per 100 feet) lower in sulphur than the "foul" in Table I. If the "foul" entered No. 2 a change would probably be necessary at the end of two or three days. A change in the rate of flow of gas through the boxes will alter the above proportions, but the general scheme will hold good.

Discussion.

The President—Gentlemen, so far as the Association is concerned at least, and within my memory, this seems to me an original line of investigation, or at least in its presentation, and I am sure that you will be interested to discuss it fully. I would like to ask Mr. Miller myself if this device that he has arranged is applicable in a practical way for regulating changes, to ascertain when changes should be made.

Mr. Miller—Yes; you can tell after experience just how much H_2S it would take to discolor acetate of lead paper. But I would not test the last box that way, because, as I have noted in my paper, you may make an error of 15 grains, so there is a risk of letting 15 grains pass through the last box.

The President—Wouldn't it be valuable in ascertaining how a new batch of oxide might be working in the first box?

Mr. Miller—Oh, yes; there is no doubt it is very valuable; but I mean, to use the apparatus to test the last box would be rather risky, because there is danger of letting sulphur into the holders.

Mr. Norris—To me the principal interest in this paper is the argument that it presents in favor of using four boxes. With the ordinary center seal of course only three boxes can be used at one time, and under normal practice a change is made when the second box shows dirty. With the valve system that Mr. Miller has, on one set of boxes, and the special center seal in the other, it is possible to use the fourth box as a catch box. The result is, as shown in these tables, that the foul box is not turned off until it has almost ceased to absorb sulphur. In a rather incomplete set of experiments made at several other works it appears that, with the 3 box system operated in the normal way, when the second box shows dirty and it is necessary to make a change, the first box is still absorbing on the average about 50 per cent. of the sulphur. These investigations are of interest, too, because there has recently been a movement in the direction of using boxes in series of two only, and this piece of apparatus used by Mr. Miller has afforded us a means of investigating just what does take place in the purifying boxes and in the preliminary scrubbing and condensing apparatus.

The Secretary—I would like to ask Mr. Miller if he considers, with these two statements, where the acetate of lead in the paper showed about 18 in one case and 16 in the other, that it is probable there is up to about that amount of sulphuretted hydrogen passing, even when the gas showed clean by the lead acetate test.

Mr. Miller—I would not like to make any statement, because I have not made any experiments to verify the amount. I might have added there that with the solution of iodine and water it is necessary to use a little potassium iodide in order to cause the iodine to dissolve. Iodine does not readily dissolve in pure water.

Mr. Nettleton—I want to congratulate Mr. Miller on the success of his paper and on the success of the undertaking. It has always seemed to me that testing with acetate of lead paper was a very crude method, and those of us who have followed it out at all carefully know that there are "ways and ways" of testing. As I understand Mr. Miller, this apparatus gives us a very close approximation of the quantity of sulphuretted hydrogen contained in the gas. May I ask Mr. Miller if the operation is at all difficult, or if it takes any great length of time?

Mr. Miller—No; the whole operation to make five tests never takes more than an hour at the outside.

Mr. Nettleton—Then it is a matter of not over 15 minutes to a test?

Mr. Miller—Yes, sir.

Mr. Nettleton—And the apparatus is not expensive?

Mr. Miller—No; I don't remember just what it costs, but it is not expensive.

Mr. Nettleton—And easy to operate by the men?

Mr. Miller—Yes. It is in a portable case, so it can be carried readily. The whole work is done in the purifying house.

The Secretary—As the subject of the 2 box system has been referred to, personally I should be very glad to hear somebody stand up for that system.

The President—We should like to hear from 2-box advocates. Those who have 4 boxes seem to have a monopoly.

Mr. Allyn—Perhaps Mr. Ramsdell might give us some information.

Mr. Ramsdell—I think the only thing to be said in this connection is that the whole question hinges upon the amount of work that is required to be done in the boxes, or, in other words, the amount of work that is performed between the hydraulic main and the boxes. If a part of this purification is performed in the passage of the gas through the apparatus before it reaches the boxes, very naturally not so much work will be done in the latter. I think that is the correct way to look at it.

The President—If no other member desires to further discuss the matter, I am sure you will indorse my extending the thanks of the Association to Mr. Miller, to whom we are very much obliged for coming so far. It has certainly been of advantage to us to get the information, and I hope it will pay him in coming so far to meet us. I think it well, gentlemen, to depart somewhat from the exact order of our programme. If Mr. Walter S. Allen is in the room I would like to call upon him for what he has to say in regard to gas lighting at the Paris Exposition. We are all very glad to welcome Mr. Allen back amongst us. We know that he held a distinguished position in the Gas Commission of Massachusetts, as well as being equally or more greatly distinguished in representing this Association at the Paris International Gas Congress. We welcome you back, Mr. Allen, and shall be very glad to hear from you as to what you found about gas lighting at the Exposition and in the city of Paris as well.

Mr. Walter S. Allen, of New Bedford, Mass., then read the following paper on the

GAS LIGHTING AT THE PARIS EXPOSITION.

The most important and most interesting exhibit connected with gas lighting at the Exposition was the lighting of the grounds of the Trocadéro and the Champ de Mars by incandescent gas lights. These areas lie on the opposite sides of the river, and were wholly lighted by gas, excepting the bridge crossing the river. The total length is about 3,500 feet, and the width is approximately 500 feet. This entire district was supplied with light by the Paris Gas Company, using both gas at normal pressure of about 1¾ inches, and gas at a pressure of 8 inches. Bandsept burners with Welsbach mantles were used on a portion of the lights, and Denayrouze burners were employed on others.

Using gas at normal pressures, there were in the Champ de Mars 495 lamp posts, with 800 lanterns and 1,900 mantles, and in the Trocadéro 455 lamp posts, with 610 lanterns and 1,400 burners, these giving together a light of about 600,000 candles. Using the compressed gas were 140 lamp posts in the Champ de Mars, with 240 lanterns and 1,200 mantles, and in the Trocadéro 50 lamp posts, with 100 lanterns and 500 mantles, giving together 400,000 candles, or a total light effect of 1,000,000 candles, using about 50,000 feet per hour.

These lamps were arranged in different ways, some of the lanterns having only 1 burner, others 2, others 3, others 5, and some of those with compressed gas had 10 mantles in 1 lantern. The consumption of the burners using compressed gas was 12.3 feet each per hour, and of those using ordinary gas, the larger groups used burners consuming 8.8 feet, and the smaller ones used burners consuming 10.6 feet. The large groups of burners were placed in lamp posts which were higher than the ordinary posts, and were provided at the top with reflectors. The effect of this illumination was far greater than that shown by electricity in any part of the Exposition, and it was one of the few things which was ready at the opening of the Fair.

In addition to this use of gas the ordinary lines of gas jets along the cornices of the buildings were used for almost all of the buildings in the Champ de Mars, only a very small section of each building immediately on the two sides of the electric fountain being supplied with electric light. On nights of illuminations, when all the electric lights were burning and the illuminated fountain was being shown with all its varying colors, the lines of gas lights along the tops of the buildings stood out very brilliantly, and, on account of the little quiver produced in the light by the wind, presented a much more artistic sight than was the case with the electric lights, which seemed to burn dim and yellow.

Outside of the Exposition, too, gas seemed not only to be holding its own in Paris, but to be making gains. For the illuminations of the 14th of July (the French 4th of July) gas was used far more extensively than was electric light, and the buildings outlined by gas flames and bearing devices of all kinds were the most attractive to be seen. The long, straight line of the Louvre carried along its entire cornice a

row of gas flames, the top of the Chamber of Deputies bearing a large sunburst with the initials of the republic, "R. F.," and the long line of the Champs Elysées was marked out by lines of gas lights run from one lamp post to another the whole distance, each light being provided with an opal globe; and under the trees this gave a far better effect than any of the festoons or arches of electric lights which were found on the Boulevard.

Paris itself is lighted almost entirely by incandescent gas lamps, some of the smaller streets still having the ordinary flat flame burner, but all the more important ones have been furnished with incandescent lamps, sometimes single lamps and sometimes two in one lantern. The lighting of the Place de la Concorde, perhaps the best lighted square to be found in the world, is wholly carried out with incandescent gas lamps.

When we consider the exhibits themselves, apart from this grand exhibit made by the Paris Gas Company, we do not find much that is especially novel or interesting, but there were certain things which merited attention. First of all was the so called Gas Pavilion, in which were collected a large number of pieces of apparatus devised for the use of gas, none of which presented any great novelty, although their methods of construction varied from those in use in this country. The second story of this building contained a large assembly room, and photographs of gas works and statistical charts. The more important exhibits were shown scattered about the Exposition. The French Gas Meter Company showed several interesting pieces of apparatus, but in general there was little that was novel.

The Stettiner Chamotte-Fabrik, in combination with the Berlin Anhalt Machine Company, showed a model of a gas works, on a scale of 1 foot to 5, showing a plant with 5 benches of 9 inclined retorts and automatic machinery for handling coal and coke. This plant, which was not a copy of any existing plant, but was practically designed to be erected in a Swiss city of about 50,000 people, was arranged so that the coal should be taken by an elevator and band conveyors, either directly to the retort house or to the coal shed, or taken from the coal shed to the retort house. To arrange this for the greatest economy of power and labor the plant was divided into three parts; a large middle hall, into which the railway cars could run directly, to one side of this the retort house proper, and on the other the coal sheds.

The coal shed was built on the hopper form, and was arranged so that the coal should be fed on to the conveyor band by means of a slide and a movable chute. which has a to and-fro motion given to it by the band itself. The coal is brought by an elevator into the charging wagons on an overhead rail in front of the furnaces, and the coal is charged by chutes into the retorts. It is claimed that one man can attend to the entire charging of these 5 benches.

The retorts are inclined, set on the Coze system, with regenerative furnaces. The coke is discharged against a screen which prevents it from falling on the floor, and leads it into a coke conveyor, which is a long trough partly filled with water, in which move two chains connected at intervals by rods, and which drag the coke along. This quenches the coke thoroughly, and it is then carried by another conveyor to the breaker, and from the breaker by an elevator to the sorting sieves and into the coke bins, ready for distribution.

The compactness of the entire plant is very noticeable. This model was actually shown in operation, the machinery being moved by an electric motor. Of course the coal storage capacity would not be sufficient for a place where a whole winter's storage of coal was kept on hand, but this part of the plant could easily be extended.

In the French section was shown a model by Coze of his system, which did not vary greatly from the one which has been described. The Paris Gas Company also exhibited a large collection of drawings, plans and photographs of their various stations, and especially their method of handling coke.

Another set of exhibits which were interesting were the gas engines. These were exhibited by almost every country and were of a great many different forms. The Otto Gas Engine Company showed its engines in connection with an ice making plant, using both gas engines and engines using petroleum, the idea being to allow the installation of such plants in country houses. These were in operation.

A small gas motor by a French maker was the principal aid in installing the large and heavy engines and electrical plant in the Machinery Building at the opening of the Exposition. The boilers had not been set in place and no steam was furnished, so that this small gas engine, which was employed to run some dynamos to furnish electricity to operate two large power cranes, was run steadily for several weeks as the only source of power in the entire building.

Among the gas engines the most interesting was the large engine of 1,000 horse power, by Cockerill, of Seraing, in Belgium. This was a single cylinder engine, intended for the use of blast furnace gases, and arranged to operate a blowing machine for use in the same blast furnaces. The blower was connected directly to the opposite end of the piston, and this machine, which had only one cylinder, was able to develop, with furnace gases, 700-horse power, the use of illuminating gas giving 1,000-horse power. This machine had a cylinder diameter of about 50 inches, and a stroke of 54 inches, and occupied a space including the blower, of about 20 feet by 55 feet, and stood about 14 feet high. About $\frac{2}{3}$ of the length fell to the engine. A very considerable number of these engines have been sold for use with blast furnaces.

The only other point of interest to gas men was the acetylene exhibit. This was divided, a portion being at Vincennes and a portion in the Invalides section; and, in addition, two different types of electric furnaces were in operation, making carbide of calcium, in the Champ de Mars. Along the banks of the Seine for a portion of the way a number of acetylene lamps were burned to add to the illumination, and at Vincennes, and throughout the construction period, before power was furnished and the electric lights used, portable generators furnishing acetylene were used all over the grounds.

I doubt if American gas men realize the extent of the business development of acetylene on the Continent of Europe at present. Large numbers of small towns of from 2,000 to 3,000 inhabitants have put in central station plants to furnish acetylene, and in some cases this gas is carried through 4 miles of mains to supply the village. In addition to this there are a great many isolated plants lighting small hotels, country houses and small farms scattered throughout Germany and France, and the business has become sufficiently important to support several trade journals devoted entirely to acetylene. Although there have been a number of accidents, still there are a great many perfected devices for generation and storage, and it has been proven that almost every case of accident was caused by gross negligence. Unfortunately, when an acetylene explosion does take place it is usually of such violence that it is sufficient to destroy buildings and produce loss of life, so that the authorities immediately have their attention called to it.

One interesting exhibit, which is on the point of being commercially exploited, while not a gas exhibit, still is of interest to all who have electric light plants. This is the Nernst lamp. This lamp, which has for its filament a thread of the rare earths such as are used in the Welsbach light, does not require any exhausted bulb, as is the case with the carbon filament, nor does it require any bulb unless it is desired for protection. This filament is of high resistance to electricity when cold, but if warmed the resistance becomes lower, the current passes and the filament glows just as a carbon one does. In order to light the lamp the current must be turned on and a match or an alcohol lighter held for a few seconds under the filament, which soon begins to glow and rapidly reaches its full light effect. If a closed bulb is used a heating coil of platinum wire surrounds the filament; this begins to glow as soon as the current is turned on, and soon heats the earthy filament sufficiently for the current to pass. As soon as the filament is in full glow the current, passing through the platinum coil, is automatically shunted out.

The commercial exploitation of this has not yet begun, and the price of the filament I was unable to ascertain, but I was assured that it would be very low; and as all that is necessary to replenish a filament which is burned out is to slip it out of its sockets and slip in a new one (a matter of 10 seconds) it would seem, if the cost is as low as it is expected to be, that this form of lamp would be of very considerable importance.

All-in all, while there was comparatively little strictly novel, the illumination of the Exposition, as shown by gas and by electric light, makes it clear that when gas is properly used and arrangements made to utilize it to the best advantage, there remains open a large field in which by its cheapness gas need not fear the competition of electricity. The experience of the city of Paris in lighting its streets and open squares with gas, even under the high cost of gas in Paris ($1.70 per 1,000) and the relatively moderate cost of electricity, 18 cents a kilowatt hour, shows gas to be quite as economical, and the light to be better distributed by means of Welsbach lights than is the case when arc lighting is employed; and I think no one will question the superiority of Welsbach street lighting over incandescent electric lighting.

Discussion.

The President—I think we can all appreciate that if the French are a little slow about reducing the cost of gas, they are not slow in the

way they utilize it. I think it would startle our American friends to hear of gas at $1.70 per 1,000 in such a large city as Paris. I am sure Mr. Allen has a great many points that he has not put on paper, although he has filled up completeiy a short one. I hope you will draw him out further.

Mr. Walton Clark—May I ask what the efficiency of the Nernst lamp is as Mr. Allen saw it in Paris?

Mr. Allen—I mislaid the notes made on that point, so I am unable to say, but my impression is they claimed an efficiency of 1½ watts per candle, or about double the efficiency of the ordinary incandescent lamp.

Mr. Walton Clark—That is the claim made in this country, I think.

Mr. Allen—The Allgemeine Electrizitäts Gesellschaft have spent a great deal of money in putting in a plant and preparing for the business, but the statement made was, they did not propose to put this lamp on the market until they should be ready to supply anybody that wanted it in sufficient quantities. They expected to be able to do it about the 1st of January, but I have not heard yet that they have really started commercial exploitation. It certainly gave a very much whiter light than the ordinary carbon filament, and seemed to work very smoothly. The arrangement by which the little incandescent filament slips in and out is so very simple that if they can furnish it at the cost talked about (not over 2 to 3 cents) it ought to make a very strong competitor for the carbon filament.

Capt. McKay—One item mentioned at the beginning of Mr. Allen's paper, which really concerns itself with selling gas, is the extent to which use is made of gas in France on occasions of festivity or celebration for illuminating and decorating at night. I have noticed it, having been present at minor expositions in a number of the cities: At Havre, when the Maritime Exposition was held; at Cherbourg, when the Centennial of the Fall of the Bastile was celebrated; and at Nice and in Paris at the time of the musical festivity and celebration. On each of these occasions it was very remarkable the extent to which use was made of gas for decorating the fronts of stores, houses, columns, triumphal arches, etc.

Mr. Allen—I must say, speaking not perhaps as connected with the gas business now, it seems to me that the gas men in the United States don't realize in any degree how it is possible to use gas for illumination on public occasions. Not only in England but in France, and wherever else one goes on the Continent, whenever there is a fête of any kind there is always a large use of gas for illumination. The large public buildings, such as the ones I referred to, the Ministry of War, the Louvre and the Chamber of Deputies, all seemed to have lines of gas piping along the cornices, which is put in place and used very freely at the time of any public celebration. The lights along the Champs Elysée, which were used only on the 14th of July, were stretches of gas pipe connecting every pair of lamp posts for the whole length of the street. These lights had opal globes over ordinary flat flame burners, perhaps a foot apart from center to center of the globe, and gave an effect to the lighting which was not secured by any of the uses of electricity that I saw anywhere in Paris. Then at the fêtes during the Exposition, where electricity and gas were both very freely used, the large lanterns used in the Champ de Mars section were often covered with paper screens of various sorts. For instance, at the time of the Vintage Festival they represented bunches of grapes, and at the time of the Flower Festival they were in the shapes of chrysanthemums and roses. The ordinary street lanterns or lamps on posts were used in the same way for illuminating purposes that we are used to seeing electric lights used, covered with colored papers. It seems to me there is an opportunity in almost any city, at very small expense for gas pipes, to arrange for such things and to keep such gas pipe on hand, so that it can be used not only once but a good many times.

Vice-President Learned was called to the Chair.

The Chairman—Gentlemen, would you like to discuss further the paper?

Mr. Walton Clark—Mr. President, perhaps Mr. Allen will say some thing regarding the use of gas stoves for heating and cooking as he saw them in Paris, if there were any on exhibition. I did not hear all of Mr. Allen's paper. Possibly he did speak of them before I got in; if not, I would like to hear from him.

Mr. Allen—I said very little about the use of gas stoves and the expense of same. These were exhibited in almost all varieties and from almost all countries. The Paris Gas Company made an especially elaborate demonstration of them. Speaking of gas stoves, perhaps it is better to speak about the gas stove as it is used practically in Paris. It is almost absolutely necessary for the owner of an apartment to furnish the apartment with a gas stove, and it is very rare in any of the better classes of apartments that you do not find in the kitchen a gas stove as well as a coal stove. I lived in apartments when in Paris, and in hunting up those I found that that was universal—the equipment of the kitchen with a coal stove and also a gas stove, not always in combination; but still in the newer parts of the town, almost invariably a combination range, having a gas stove portion, was to be found. Of course, the development of the use of gas for cooking in Paris has been very large, owing to the high price of coal. The ordinary coal used in Paris for domestic purposes rarely falls below $13 a ton, and during this last summer it reached $16 a ton. Even with the high price of gas at $1.70 per 1,000, and the economical arrangement of the ordinary French range, which uses very much less coal than the American type of range, gas is found to be very economical for cooking purposes. For heating I doubt if much is used. Nearly all the larger apartments have the hallways, and to some extent among the newer apartments, the apartments themselves, heated from a central furnace, and in the houses there is never any gas except in the living rooms. None of the bed rooms have any gas or even have any coal fires. The heating of a French house is almost entirely done by coal or by wood; but the use of gas for cooking is fostered in every way by the Paris Gas Company. The Company is also trying in every way to get the use of gas extended in small houses. It is putting in and supplying a gas stove, a meter, the risers in the apartment houses, and a certain amount of fittings, in all apartments of which the rent does not exceed $100 a year, free of charge. If the rent is higher than $100 per year the owner is expected to pay for a certain part of the cost of installation or for the whole of it, but in the cheapest class of apartments the Company supplies all these appliances free. Of course, the Paris Company is now engaged in a very bitter contest with the government, its franchise running out in 1904, and with the very poor form of existing contract, under which it has to divide ½ of its net earnings beyond a certain amount with the city, it requires the consent of the City Council to reduce the price of gas. The Company has desired for a number of years to reduce the price but the city has opposed it. Now the city wants the price reduced, but does not want to give any advantages in the extension of this contract. The Company has made an offer to make the price ⅞ of what it was, beginning with the 1st of January of this year, in consideration of an extension of the tranchise until 1925; but that had been refused by the Council, and when I left Paris matters were still where they were before. The extended use of gas in Paris is undoubtedly very much hampered by this very high price, high even in relation to the high price of coal.

The Chairman—Somebody has suggested, Mr. Allen, that you say something in regard to the high pressure burners that are in use for street purposes in Paris. Can you give us any information on that point?

Mr. Allen—Unfortunately I cannot give any detailed information regarding those used in Paris. The burners that were used at the Exposition were of the Denayrouze air mixing type of burner, which I don't think has been used anywhere in the streets in this country as yet. I think Mr. Shelton has looked into that matter a good deal more thoroughly than I have and probably could give more information.

The Chairman—Mr. Shelton, can we hear from you on that matter?

Mr. Shelton—I am sorry to have to reply in the negative. The high pressure work with which I have been identified has been mostly the conveyance of gas considerable distances under high pressure (several pounds), and converting it then to the ordinary low pressures. I have no figures on the working of burners at the ranges of 8 or 10 or 15 inches pressure, such as have been referred to.

On motion of Mr. Nettleton, seconded by the Secretary, the thanks of the Association were tendered to Mr. Allen for his interesting paper.

A Telegram.

At this point the Secretary read a telegram from Mr. C. M. Higgins of New York, expressive of congratulation and good fellowship, and of regret that he could not attend the meeting.

The Secretary having made an explanation as to the ways and means of obtaining tickets for the annual dinner, and urging upon the members the necessity of applying for the same early so the hotel people would have ample notification, further said:

The matter referred to in the President's address, of getting autographs attached to the records, which is provided for in the Constitution as part of becoming a member of the Association, that the signa-

ture shall be affixed to this book, has been somewhat neglected, and there are a good many members whose names are on the rolls whose autographs are not on the book. The book is here, and if members will kindly come and sign it they will comply with the requirements.

President Addicks then resumed the Chair and said: As it is now nearly the hour for recess, it is suggested that the remaining minutes be devoted to a look into the contents of the

QUESTION BOX.

No objection being offered, the Secretary read the following questions:

"Is the use of prepayment meters increasing; and does it pay?"

The President—This should be an easy question to answer. Mr. Nettleton, would you like to say something in reply to it?

Mr. Nettleton—I have talked so much that I dislike to speak again; but I may say I believe personally and very thoroughly in the prepayment meter. At Derby, where I have been pushing it for a number of years, we commenced in the fall of 1896, and by the following April as I remember we had 17 meters. We now have about 1,300 in use. The percentage of prepayment meters to the total number of meters is, as I remember, 45. It has enabled the Derby Gas Company to reach a class of consumers to which I had never expected to sell gas. The working people, the people with very limited incomes, families whose heads earn from $1.50 to $2 a day, are, I was going to say, very generally using gas, largely for cooking purposes; and the tendency with many of those families is to use it also for light to a limited extent. For several years it has been our practice, with almost all the ranges we have sold, to put a bracket, furnishing it free, at a convenient point near the stove, and we have found that that burner has been used a great deal, and in a good many cases that or something else has led to the piping of these houses and putting up fixtures generally through the house. Of course the prepayment meter costs more than the ordinary meter. I have been into the matter somewhat carefully, and think interest and depreciation on the extra cost can be covered by 50 cents. I do not think that that covers the extra cost of repairing the meter, over the ordinary meter, but the extra cost of that certainly will not exceed 20 cents per year. Now, the care, the taking of the money from the meters, entering it on the collection books, and then putting it on the prepayment consumers' ledger, does not exceed, and I think is materially less than 72 cents per year. That will make at the outside $1.42 per meter per year. I believe with 2,000 meters that the amount would be materially less. Now, for ordinary meters the taking of the statements, bringing them into the office, making out the bills, collecting them, adding in the losses and the annoyance that men are subjected to by sending out time after time, it seems to me must cost very much more than the $1.42 per meter per year, which I have named. And then, beyond that, you do away with friction with your consumers. It is a cure-all for the chronic grumbler. As I said when I started out, I want to repeat that I believe thoroughly, Mr. President, in the use of the prepayment meters.

The President—Mr. Nettleton, I am very glad I called upon you for the sake of the Association. I had a case yesterday where I had decided to put in a prepayment meter where we would not ordinarily do it—that is to say, in a new building—because we prefer to put in the ordinary meters merely on the question of the capital charge, which is quite essential with us. The occupant said: "Well, if I cannot have a prepayment meter I'll put in electric light." So he got the prepayment meter. We would like to hear from some one from the West.

Mr. Pratt (Des Moines, Ia.)—Mr. President, with us I think I can say the number of prepayment meters is increasing. It has gotten to that point now where we are endeavoring to check the use of prepayment meters, except among that class of consumers to whom Mr. Nettleton referred—the poorer people. We find that the desire for its use has extended to the point that people who are amply well able to pay their bills are desirous of having prepayment meters. I believe the prepayment meter pays for the reason suggested that it appeals to the poorer class of people, those who have been possibly in the habit heretofore of hanging out their gasoline card and paying for 5 gallons of gasoline in advance. It enables them to become users of gas under the same general regulation or plan that prevailed when they were buying gasoline.

The President—Mr. Sherman suggests that Mr. Learned, of Meriden, Conn., could give us something of interest on this subject.

Mr. C. A. Learned—I do not know that I can add anything to this discussion. I believe in the use of prepayment meters, and have a number of them. We rather think that the use of one kind is better than to have a number of sorts, and they are in every respect a success. The question comes up with a great many managers whether or not the price with prepayment meters shall be more than that through the common meter. The net price charged affects everybody. That is, if the price, for instance, is $1.25, then the meter may be set exact with some makes; with other makes it may be set within 2 or 3 cents of the amount. As it happens, in Meriden our price is such that we set our meter 3 or 4 cents in advance of the regular price. We think it is an advantage, and they work most satisfactorily. I don't think that I can add anything to what has been said. We are very much in favor of them, but we will say that to our better class of consumers we are checking a little. We have a good many applications from people who have used gas for a number of years in the regular way asking us if they may not have a prepayment meter. We explain to them why they had better not have it, and they go away satisfied generally.

Mr. Barnes—Mr. President, I should like to ask Mr. Nettleton and Mr. Learned also whether they have had any trouble from the breaking into of the cash boxes and the appropriation of the money deposited. I should also be glad if Mr. Learned would state what the reasons are that he gives to his better class of customers for not having prepayment meters.

Mr. C. A. Learned—The better class of customer, the Company working on a discount, comes to the office regularly and pays within a period, and we are not anxious under those circumstances to have him change over. Breaking into cash boxes with us has been very limited. Once in a while a 5 cent piece is squeezed in; but that is generally redeemed. Occasionally a thin portion of a meter inlet, that covers the inlet or outlet, in being shipped from the manufacturer to us is found and slipped in, but those happenings with us are rare. I will, however, admit that in large cities there is great trouble with the prepayment meter.

The President—It was not quite clear to me, and I presume it was not to Mr. Barnes, this reason that you gave to the better class of consumers why they should not have a prepayment meter.

Mr. Barnes—I inferred from what Mr. Learned said there were certain reasons that could be given showing why it was to the advantage of the better class of consumer not to have a prepayment meter. These reasons I would like to have repeated.

The President—I also would like to have some assistance on that score.

Mr. C. A. Learned—A good many reasons are given to different customers, and they may not always be just the best reasons. One simple reason is to state to the party that these meters are given out to the poorer classes of consumers, whereas the applicant of the other class who has always paid his bills very promptly is under no particular obligation in an ordinary business way to go into his cellar and deposit a quarter when the gas is exhausted. Again, sometimes they would find that in the house they had no bill smaller than a 1, 2 or 5, so they would be obliged under those circumstances to go to their neighbor (laughter). There are a good many reasons, but perhaps these two will suffice.

The President—Perhaps Mr. Learned means the neighbor would rather enjoy loaning milk, but when it came to loaning money he might object.

Mr. Walton Clark—Mr. Nettleton gave as one of the reasons in favor of the prepayment meter that it helped keep the chronic grumbler away from the office. I believe most complaints registered at the gas office are due to bad burners and local service. I would not like to do anything that prevented a grumbler from coming round and having it out at the office. I think it is for the good of the service that any man who feels discontented should come to the office and tell his tale at the complaint desk, in order that he may be shown that the service can be good, and that the gas company intends to have the service right and will so make it upon complaint.

Mr. Nettleton—I did not wish to be understood as saying that it prevented the chronic grumbler from coming to the office. Nor did I intend to be understood as saying that it did away with all complaints from the chronic grumbler. In *most* cases this prepayment meter does away with the cause of complaint. As answering other questions asked, I would say I think there have been six cases of robbery in the five years that we have had prepayment meters, and the loss has been very trifling.

Mr. Browne—It was only last evening I read that beautiful story of a man who told the children in his neighborhood that the prepayment

meter was a savings bank. I should like to know whether the gentle man is present who owned that meter?

Mr. Pratt—We have a colored citizens' church in our town which makes a collection for the benefit of the prepayment meter a part of its service. I would also like to say to the gentleman who made inquiry if prepayment meters were ever broken into, that we have not only had a few meters broken into, but we have had one of our pre payment meter collectors held up to the tune of $220.

Mr. Barnes—We have not any colored citizens' church in our city that uses the prepayment meter, but we have one in which I wish a meter could be placed. We should have less trouble collecting the bill, I think.

The President then declared a recess, to terminate at 2:30 P.M.

[To be Continued.]

New Business.

[A paper read by MR. J. C. SLOAN, of Port Huron, Michigan, at the 8th Annual Meeting of the Michigan Gas Association.]

How to secure "New Business" is a question that should interest each and every gas superintendent or manager here represented, and I believe the question is one requiring as much thought and study as any one problem in the gas business to-day. The time has passed when gas officials can sit comfortably in their offices and wait for business to come to them. Other lights and fuels come in close competition, and incandescent gas burners and more efficient gas stoves have reduced the amount of gas sold per meter, making "New Business" more necessary in order to keep up gas sales.

I believe it has been generally conceded that gas companies' future increased sales must depend, principally, on gas sold for fuel and power. I admit that gas companies' fuel sales have grown, and are growing, far beyond what was ever prophesied in our early history; but I do not believe it is good fellowship or business to entertain lavishly and in luxury a new friend, to the neglect of a trusty and loyal old one, especially when the old friend appears to be growing young and stronger, and is repeatedly conferring favors in the face of apparent neglect. Incandescent gas burners have revolutionized the gas lighting business, and I believe if the same inducement had been offered the public to burn gas for light as has been offered them to burn gas for fuel, that illuminating gas sales would show a profitable increase instead, as in many places, a decrease. I recognize the fact that, until recent years, incandescent burners had not reached that perfection to encourage gas companies to do this, but it seems to me that at the present time, and until better and cheaper electric lighting is discovered, that gas companies have a good chance "to have and to hold" a good share of the lighting business. If anyone doubts this statement let him investigate, and I am sure he will find any number of stores and business houses that used electric light a year ago that are using gas now; and the same condition that applies to the business houses applies to the homes.

A 16-candle power incandescent electric light was a revelation and a serious competitor of gas during the latter part of the 19th century, but the brilliancy of the incandescent gas light has so dimmed its luster that to-day its rays are only sufficient to use in clusters, and to form letters or advertising purposes, to welcome conventions and possibly read, "Welcome, Gas Men."

I appreciate the fact that in different cities gas companies sometimes require different means to successfully increase their gas sales. For instance, a small company cannot always apply the same means large companies can. They have not the money to invest, and the business is not to be had in proportion to the cost of getting it.

There is, however, one element, that it seems to me applies to big and small companies alike, in regard to its being a good thing, and that is, a well furnished office, centrally located. I believe it is to gas companies' best interest to carry in stock and sell at a moderate profit anything that used gas economically that the public will buy and use, and in order to sell anything it must be exhibited where the public can see and examine it.

In addition to the increased gas sales gas appliance sales' afford, a central location gives an opportunity to display a well lighted office, and anything new in the shape of gas appliances or burners, to say nothing of the convenience such an office affords the public and the value of its advertisement.

In regard to advertisement, I believe a little money judiciously spent in this direction is beneficial, but that much is wasted. Conditions possibly have changed this medium so far as cooking by gas is concerned. A few years ago this was information to the public, but to-day the woman that doesn't know that gas is the best kitchen fuel will scarcely be convinced of that fact by a few illustrations showing the before and after effect, and the reading contained in that form of advertisement. I sincerely advocate the kind of advertisement that starts people to say kind things of the gas company and its management. I do not mean by this that politeness should be made a display, and a cannon shot off with it to attract attention, but that it should be sincere and of a kind that impresses a consumer you are not doing him a favor but your duty when you correct his complaint. I admit that many imaginary complaints come to every gas office, but they all should be treated as real until you can prove there is no cause for complaint. I make this argument, for I believe that politeness not only helps gas companies to retain their business but assists them to increase it.

I believe that paying men to solicit is the best investment of money in securing "New Business," but with small companies there are only a few months during the year when they can afford to hire men for that express purpose, and the balance of the year depends on the energy of the manager for the increase. At such times, and all times, I would urge managers of small companies not to lose an occasion to solicit the increased use of gas, and to add a light whenever an opportunity affords. I have found it easier to get business when I could say, "Your neighbor next door or across the street is having the gas put in now;" and have worked particularly strong while their neighbor's work was being done. I have two reasons for this: First, better success in getting business; second, economy in doing the work.

While I am more than anxious to secure new business, I do not believe in using argument that is not strictly and wholly true to obtain it. For instance, I consider it poor business to advise the use of gas for any purpose not practical and economical. It cannot help sales longer than you can delay presenting a customer his bill, and will cause ill feeling and harmful talk.

Last fall a lady asked me if she could heat her house with gas. I told her she could if she had plenty of money. But, continued the party, "Cannot I heat with gas as cheap as with coal?" I said I did not think so, and advised her to set up one coal stove and use gas for the balance. To my surprise my advice was not accepted, so we sold the party gas heaters and piping to the amount of $20.

For the months of October and November this lady came to our office with a sad, sweet smile, and paid her gas bill, but when she came to settle her December bill, amounting to $20.50 net, there was an expression on her face that was neither sweet nor sad, as she presented the bill and asked, "What I could allow her for two gas heaters she could spare." I asked rather innocently, "Don't you need them?" She replied, "No; I have set up a coal stove." I was kind of aching to say, "I told you so;" but the party had "sand" and paid her bill without giving me the chance. I venture to say that had I advised this party to use gas for heating her house that she would not have paid her final bill, and I scarcely believe I would have blamed her.

I believe in free service connections to the meters—free connections for gas ranges and, outside of taking care of complaints; just as little other free work as possible. I positively advocate that gas companies should do gasfitting and should pipe old houses at cost or very low profit; $1.50 an opening is a good, fair price for first-class work, and it might be done for a little less.

Only when gas companies do fitting and sell fixtures can they give a satisfactory reply to the first question asked, when they solicit new business, namely, "What will piping and fixtures cost?" If you cannot answer that, and you send them to the plumbers and dealers to ascertain, you might just as well tell them to go to the devil for their information, for there is about as much chance of them coming back to your office and ordering a meter as there would be if his Satanic Majesty got his hands on them. I tell you, gas companies must do gas fitting, sell gas fixtures and gas stoves, and their managers and employees must talk gas if they want to successfully increase their gas sales.

My final suggestion is, "Keep-a-pushing"; get business you can hold; get it honestly if you can, but get it. Do not push the sale of gas sold for fuel to the neglect of gas sold for light, and do not push either with less energy, because you are pushing both.

The gas manager who has not adopted any of the recognized plans for securing "New Business," and is comfortably waiting in his office for business to come to him, reminds me of the German who, having recently landed in this country and not being accustomed to handling horses, was given one to transact an errand. The poor fellow had never been on a horse before and did not know how to address it or

what to do to start the beast, so after waiting considerable time and the horse having made no motion to start, he said, addressing the horse: "Vell, commence."

I do not believe there is a manager represented in this Association who is waiting in his office for business to come to him, but if there is, I would urge him to "get a gait on," "get busy," "commence."

Extension of the 40,000-Volt Lines of the Telluride Power Transmission Company in Utah.

By Mr. J. R. Cravath, in *Electrical World.*

To the Telluride Power Transmission Company the engineering world owes a debt of gratitude. The management of this Company was the pioneer in commercial transmission at high voltages in the mountain districts of the United States, going ahead where others feared to tread, and demonstrating facts which were of the greatest value. Then followed the famous Scott experiments, which were made on this company's property at Telluride, Col., and where line volt ages reached 135,000. This Company has for 3 years been operating a line at 40,000 volts, transmitting from the Provo Cañon, north of Provo, Utah, to Mercur, Utah, a distance of 35 miles. This was principally for supplying power to mines, and is the highest voltage line in regular commercial use at present writing. In addition to this, 70 miles more of high tension line have been completed, so that the transmission line now completely encircles Utah Lake, supplying power and light to various points on the circuit as desired, and returning to the Provo Cañon plant from whence it starts. In ordinary operation this practically gives 2 circuits to any point on the circuit, and is much better than duplicate lines on the same pole line, because some kinds of interruptions would affect both circuits equally if on the same pole line. The circuit is sectioned up so that in case of a breakdown on one section that section can be cut out and the service supplied by the lines on both sides of the interruption. Repairs are regularly carried on in this way without interruption of service. No repairs are made on the live line, as it is impossible. The transformers are operated with Y-connection, and the neutral point is grounded for the protection of the transformers against lightning. In the 3 years since the plant started the only 40,000-volt transformer lost was one which accidentally got wet. The first transformers for the 40 000-volt line were built under the supervision of this company's men at the Wagner factory in St. Louis. They are oil insulated. The line insulators are triple petticoat glass, made by the Hemingway Glass Company, Muncie, Ind., and designated as Provo No. 1. There is no trouble from puncturing these insulators from the voltage alone, but they are shot at and broken occasionally. The Telluride Company uses glass for insulators on all its work, and believes it to be superior to porcelain. The glass insulators are not put to any electrical test before being put up, because defects are apparent to the eye with glass, as they would not be with porcelain. These insulators are about 7 inches in diameter. They are not center bearing, but the wires are tied into a groove on the side.

It is of value to note that this line has not been subject to interruption by the throwing of wires, sticks and weeds across the lines, as have some of the other lines in the State. This is mainly because of the great distance apart of the line wires. They are placed to form the corners of an equilateral triangle, and are 64 inches apart. The top wire is on a pin on top of the pole, and the other two are on a cross arm 7 feet long. This creates conditions so that it takes a great deal more skill and strength than the meddlers seem to care to exert to throw over the lines anything long enough to make a short circuit. It has been found not only impossible to use the telephone over circuits run on this same pole line, but the presence of the telephone circuits proved a source of danger to the poles. The telephone wires were run on short cross arms, and discharges across from the pole to the telephone wire frequently burned holes in the pole. Running with a grounded neutral doubtless has much to do with these effects. The locust pins on the transmission line were all boiled in paraffine, and the cross arms were treated by being kiln dried and then dipped in a bituminous compound of 100° F. The bitumen penetrates ⅛ inch into the wood. It is found that metal bolts and nails are good things to avoid in poles, because if there is any leakage down the pole it is concentrated by the metal so as to char the wood around the bolts. This Company's new work will have no bolts, but will have holes cut through the pole tops to fit the cross arms, and the cross arms will be driven through and held in place by locust pins. On level ground 40-foot poles are used, and in mountainous country 35-foot. Lines for the telephone service, which is necessary in operating a system of this kind, are leased from the Rocky Mountain Bell Telephone Company. The high tension line from the Provo Cañon power house to Mercur, which was the one first built, had 44 poles to the mile, and consists of three No. 5 copper wires. From Mercur to Eureka the line is of aluminum stranded cable, equivalent to No. 5 copper, and made up of 7 strands .088 inch diameter. From Eureka to Provo the line is stranded aluminum cable, 7 strands of .099 inch diameter. Poles on the aluminum line are set only from 26 to 33 to the mile on account of the lightness of the aluminum. This, of course, makes quite a difference in the cost of the line as compared with copper in addition to the saving in the cost of the wire. Solid aluminum wires were first put up, but had to be replaced with stranded cable, because of breakage.

At most of the sub-stations the reduction is from 40,000 to 5,000 volts for local distribution. The greater part of the company's load is in the shape of induction motors. There are a few towns lighted, but that load is small compared to the total. All charges are by flat rates.

The capacity of the 105 miles of line is very great. With no load on but the transformers, the apparent kilowatts at the power house are 750, and the actual watts nearly nothing. As the load comes on the wattmeter rises and the ammeter falls until at about ⅓ of the station's full load, the power factor is 95 per cent. No need for synchronous motors to improve the power factor on that line! It is, however, a novel sensation to the majority of engineers to see the ammeter fall as the load rises. The 5,000-volt distribution in the town of Provo is over No. 8 B.W.G. iron wires. The pole lines are run down the center of the wide streets, and transformers and incandescent street lights are hung directly from the cross arms. The primary wires have a cross arm on top of the pole, while below it are the secondary mains. The Eastern reader may smile at this arrangement, but it is not exaggerating to say that the pole lines are neater in appearance and safer in fact than in 9 out of 10 Eastern towns of the same size. The East has much to learn from the West in the matter of neat pole line construction.

Although the Telluride Power Transmission Company's Utah system is already extensive, important permanent additions are to be made to it. In place of the present plant in Provo Cañon, a more permanent one will be built at the mouth of the cañon to develop 8,000-horse power at 380 feet head. There is now going in at Logan, Utah, a 3,000 horse power plant, which will connect in parallel with the present 105 mile circle by a 90 mile 40,000-volt aluminum line running down past Ogden and Salt Lake City, at which latter place it is not unlikely that some power will be delivered. A. S. Woodhouse is Superintendent of the Utah department, with headquarters at Provo. The main office of the company is at Telluride, Colo. A 15,000-horse power water power is also being developed 70 miles from Butte, Mont., by parties interested in the Telluride Transmission Company.

SPECIAL ENGLISH CORRESPONDENCE.

Communicated by Norton H. Humphrys.

Salisbury, England, Feb. 9, 1901.

The Picturesque in Gas Works.—Gas Fires.—Coal Prospects.—Electrolysis and Electrocution.

One of our daily newspapers has been dealing with the picturesque in gas works construction, and has published an illustration showing how a gas works can be converted into a garden of the gods. The drawing, which is more calculated to amuse gas engineers than to edify the public, includes three designs for the externals of gasholders. One comprises a broad raised terrace at the base, with parapet and flights of steps, the columns are enriched by pediments and capitals, and there is a heavy frieze surmounted by a dome and center statue piece, a suitable subject for which would be the designer himself. A second is beautified by the addition of a kind of piazza with porticos. The least successful effort is the chimneys, which are simply grotesque, and resemble a parapetted tower with a gigantic chimney pot for a center piece. These buildings are surrounded with broad walks, rows of trees, ornamental water fountains, and rockeries. The artist is evidently an unpractical sort of person who entirely loses sight of the fact that his proposals would involve an enormous outlay to no purpose. No one goes to the gas works in search of the beautiful in art, nor is it a place of public resort, and 99 people out of a 100 do not care a rap whether the gas works is embellished with fountains and statues, or as bare as a workhouse yard. But there is a very real demand for cheap gas, and it can only be met by a scrupulous avoidance of all superfluous expenditure. It will be an interesting and instructive lesson to this exponent of the picturesque, if he could be

afforded an opportunity of submitting his designs with full estimates of cost, etc., to an experienced board of directors who were contemplating reconstruction, and hear what they had to say about the proposal to spend money on statues, porticos and friezes, piazzas, etc. One would also like to hear how he would deal with the important question of capital outlay per million cubic feet of productive capacity. The style of building adopted in gas works is certainly not below the average, as regards elegance of design, of the usual run of factories and workshops, and the probable reason for pitching upon them as chief offenders against the public taste, is the appearance of the gasholder, which, being devoid of architectural decorations, and painted with a preservative paint that is not necessarily of a pleasing color to the eye, is certainly not a thing of beauty. In some continental cities the gas holders have to be inclosed in a building of approved design, but public feeling is not sufficiently strong on the matter to induce such procedure in this country.

But apart from the strictly utilitarian aspect of the question, the constructors of gas works are not wanting in an innate sense of the fitness of things. While they do not go in for a style of architecture suited to the grounds of a royal palace, they contrive to conform to the rules of good taste, and if the gas works must be in a prominent position, manage to avoid making them an ethical blot or eyesore. I have seen small works intended for the supply of country mansions and large institutions, that really added to the beauty of the landscape, and larger ones that happened to be located in a good class neighborhood, and certainly gave no offence on the score of aestheticism. But nine out of every ten are situated in a poor and out of-the-way quarter of the town, surrounded with plain working class tenements, and it would appear as incongruous to finish them in high class architectural style as to dress the stokers in attire suited to a dinner or ball room. Let us have elegant simplicity at the gas works by all means, but no ostentatious ornament. A gasholder in its bare outlines of lattice work and diagonal rods is not a greater offence against good taste than a bogus cathedral or a sham mausoleum.

Since writing on the subject of gas fires in December last the matter has received considerable attention in the colums of the *Journal of Gas Lighting*, and questions have been propounded that are easier asked than answered. It is surprising, both in regard to gas cookers and heaters, that architects and builders appear to be ignorant of their existence. There are many districts where the ratio of gas cookers to gas consumers is more than 1 : 2—that is to say, that at least every alternate consumer cooks by gas, and where the proportion of gas fires in use is not much less. In residential flats or office chambers of a superior class the chances of the gas stove being required are even greater. And yet houses are designed and constructed on the lines in vogue before gas was introduced, and no one thinks of providing a proper recess with flue for the cooking stove, or any arrangement for altering the usual pattern of chimney, so as to render it a suitable flue for a gas fire, which it is not, as at present made. The result is that both cooker and heater have to be fitted and used in a make-shift fashion that interferes both with their efficiency and economy and induces people to do without them, or at any rate to hesitate about adopting them. The plan of allowing all the burnt air, fumes and steam from the frying pan, griller or stew pan, to escape freely into the atmosphere of the apartment, is but little less barbarous than the ancient device of an open hearthstone in the center and a hole in the ceiling for the smoke to get out. A gas fire placed in front of an ordinary coal grate and mantle is always more or less of an excresence. There should be a proper recess for the gas cooker and a means of reducing the sectional area of a chimney to suit the gas fire. The fact that people will use gas for cooking and heating under existing conditions, and will accept these inconveniences in order to secure the advantages that are only obtainable by the use of gas, is not a satisfactory conclusion of the matter, either to the gas company or to the user. It is simply another form of the old trouble about gas fittings, in respect to which the gas company find themselves floored between the two stools of landlord and tenant. The builders and house agents say that tenants do not value time or labor saving appliances. There are certain things, such as water supply and drainage, that they look for as a matter of course, but beyond that are influenced by appearances only. Showy paper and paint, stained glass, something genteel and artistic, or a passable pretence in that direction, is the thing in demand. In other words, the present is an age of sham and people cannot afford to consider solid comfort. And the only hope of improvement is in the gradual education of the householders. At present it is quite possible that an advertisement of a "residence fitted with proper accommodation for gas stoves" might pass unheeded, whilst shoals of applicants would rush for an elegant residence with "spacious entrance hall and noble reception rooms," offered at a low rent, regardless of the fact that they have no friends to entertain or means of entertaining. It is only a phase of the general question of cheapness versus value, and show rather than use. Gas companies can meet the deficiency to some extent by letting appliances on hire on either direct or indirect terms of payment, but are confined to movable chattels. As regards fixtures or structural additions they are helpless. If the public could only be educated to demand a few trifling alterations in the stereotyped style of structure, to suit modern improvements in gas appliances, there would be a very large increase in the demand for gas.

It is rather early yet, to attempt to deal with the effect of high priced coal and the phenomenally mild weather that was experienced throughout the half year ended December 31st upon the gas industry. The two principal gas companies of London show a considerable falling off, the Gas Light and Coke Company having actually gone back 6 per cent., while the South Metropolitan have only increased 1.8 per cent., and both concerns are inclined to ascribe the deficiency as partly caused by the necessity for increasing the price of gas. Whether other undertakings are likely to be affected by this cause is a matter that remains to be shown, but in any case dear coal is not favorable to a prosperous state of affairs in the gas industry, and we therefore hail with delight the indications that a considerable slump in the coal market is not far distant. There were some who claimed that this event would come before Christmas, and that gas companies would do well to hold their hands in the matter of contracting, after the usual custom, for a supply up to June 30th. But here we are, approaching the middle of February, and no one has yet been able to get any considerable quantity of cheap coal. Those who went into the market in January has to pay 2s. 9d. or so more than the current contract rates as entered into in July last. But no one is putting any quantity to stock at present rates. There is any amount of coal to be had, but gas companies are not taking more than they are bound to do by agreement, looking for some relief before the time for contracting and for filling up the coal sheds comes round again. They have been helped to a great extent by the excellent state of the coke market which was probably never in a more healthy condition, and prices have, throughout the winter, more than kept pace with those of coal. Unfortunately tar and ammonia have not synchronized with the weak state of general trade, which is always indicated by dear coal, but have remained in a somewhat weak and dejected state.

The question of electrolysis in connection with gas and water mains is beginning to excite attention in London. There is an electric railway between the City and Clapham, a distance of about 3 miles, passing through the district supplied by the Lambeth Water Company and the South Metropolitan Gas Company, and both these Companies have found evidence of injury to their pipes. Two other lines have been opened in London, but have not been in use for a sufficient time to produce much effect. The Board of Trade held a special inquiry into the subject in 1893, and as a result prepared a set of resolutions that in their opinion are an effectual preventative against damage from this cause. Some eminent electricians do not accept this view, and the experiences in the Southeast of London show that their apprehensions are not without foundation in fact, and that something more than the existing regulations is needed, if the gas and water mains are to be kept sound. This means a great deal more than the mere protection of the revenues belonging to the companies. It is a question of public convenience, health and safety. It is more than the obstruction of traffic necessary for the examination and repair of the mains. The escape of large quantities of water may be the means of serious accidents, and with gas there is the risk of asphyxia and of explosion, resulting in damage to property and even loss of life. The unfortunate part of the position appears to be that the government are not inclined to take further action in the absence of evidence as to actual damage. Some people suppose that the owner of a savage dog is free from any responsibility following upon the animal's first bite, on the plea that he could not know that it was vicious until it actually injured somebody. The electric people are in a similar position. They are the proprietors of a "dog" that is known to have a bad character in respect to iron pipes, and is said by the best authority, without contradictton, to be sure to attack them. Yet the government want evidence of damage, and therefore all the owners of pipes must be on the watch. They must not cry before they are hurt, and the only course when the first twinge comes, is to keep up a loud yell, that will rouse the Westminster Bigwigs to a sense of their responsibility to the public.

Whilst we are talking of the changes brought about by stray electric currents underground, a terrible example of the risks common to the

use of overhead wires comes to hand from Liverpool A mesh of telephone lines, crossing a principal thoroughfare at right angles, was broken down by the weight of snow accumulated on them and fell across the trolley wires pertaining to the electric tramway, which were at a considerably lower level. The ends of the telephone wires fell on the ground making a short circuit for the strong current in the trolley lines, and the result was a dazzling display of artificial light. But several persons were entangled in the wires, and presented a most painful spectacle, as those who went to their aid were incapacitated by receiving severe shocks. All traffic was suspended until the trolley current could be stopped, and it was then found that two men and two horses had been electrocuted. Sixteen persons were treated at the Royal Infirmary but only two were retained in the Institution. This sad event furnishes a powerful argument in favor of keeping electric wires underground, and as such accentuates the need for immediate attention to the question of electrolysis.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. S. M. Highlands, President and Superintendent of the Clinton (Iowa) Gas Light and Coke Company, is a correspondent from whom we are always glad to hear, for he has always something good to say, and good things spoken or written are pleasant to hear or to read. His last message to us is as follows : It will probably interest you to know that our business has increased over 60 per cent. in the past two years, and that we have now grown to the point where a new gas making plant is a necessity. We have entered into a contract with the Stacy Manufacturing Company for the erection this summer of an 80 foot telescopic holder, and have bought about 5 miles of street mains, running from 8 to 16 inches in diameter, and will add to that about 4 or 5 miles more of 4 to 6 inch pipe for supplying the wants of this little community. We will also erect this summer a new retort house, 32 feet by 100 feet, and a new purifying house with a set of 16 feet by 16 feet purifiers ; and will probably add an additional station meter. We expect to set not less than 500 stoves this summer, which in addition to the 1,400 we have already in use, will make a fairly good average for a town of only 25,000 people. But the new railroad built last summer, and two more assured for this summer, together with five we already had, we expect will increase the population of this town not a little bit. The only difficulty we had the past year was in supplying gas as fast as our consumers were wanting it.

At the annual meeting of the Waterbury (Conn.) Gas Light Company the officers chosen were : Directors, F. B. Field, George E. Terry, W. B. Merriman, E. A. Pendleton, F. G. Wooster, W. S. Pardee and F. A. Sherman ; President, G. E. Terry, Secretary and Treasurer, F. B. Field.

Mr. J. P. Dusenbury, Secretary of the East Newark (N. J.) Gas Light Company, has notified the shareholders that a meeting will be held at noon, on Friday, March 8th, in accordance with the following resolution :

"*Resolved*, That the Directors of the East Newark Gas Light Company declare that it is advisable to extend the corporate existance of the East Newark Gas Light Company, and direct that a meeting of the stockholders be held at the office of the Company, at No. 575 Broad Street, Newark, N. J., on Friday, March 8, A. D., 1901, at 12 o'clock, noon, to take action thereon."

The proprietors of the Fresno (Cal.) Gas and Electric Light Company have entered into a contract with the Western Iron Works of San Francisco, Cal., for the construction of a single lift gasholder, to rest in a steel tank. We have no figures as to dimensions.

Work is to be commenced at once on the new gas plant for Durham, N. C.

The Suburban Gas and Electric Company is to construct a gas plant, at Revere, Mass., this spring.

The American Bridge Company announces that its sales during the month of January were the largest of any month since the organization of the Company, aggregating 60,000 tons.

The Kalamazoo (Mich.) *Telegraph*, dated Feb. 18th, said : "The entire plant of Kalamazoo Gas and Electric Company (it was an opposition concern) was sold at public auction this morning. The real estate, machinery, etc., were bid in by Mr. J. J. Knight, representing the Kalamazoo Gas Company, for $5,000. The gas mains were bid in by Mr. Jacob DeKam for $2,700. The franchise was also sold for $75, the purchaser being Mr. Knight." This "enterprise," by-and-large, cost its backers of one time or another quite up to $100,000.

The proprietors of the Meriden (Conn.) Gas Light Company have again shown their progressiveness by ordering a sensible reduction in the selling rate. At a special meeting of the Board, held February 26th, it was ordered that the gross rate should be put at $1.50 per 1,000 cubic feet, a discount of 10 per cent. per 1,000 to rule for prompt payment—within 10 days. Customers whose monthly bills exceed a certain value are to have their supply at the rate of $1.20. Last year the Company's energetic Superintendent, Mr. Charles A. Learned, completed a series of important plant betterments that greatly benefited the Company during the heavy output time of the last winter. These betterments included a well arranged purifying plant of 4 boxes, of the dimension of 16 feet by 16 feet, by 6 feet, the gas entering at the center, and a new 9-foot station meter. The bettering further included a completely equipped works office. This year still more important enlargements have been arranged for. The main or chief plant addition is a holder to rest in a steel tank. The holder dimensions proper are : Diameter, 115 feet ; height, 100 feet, divided into 3 lifts. The contractors for the holder are Messrs. Bartlett, Hayward & Co., of Baltimore. The Company also proposes to put up a modern generating plant on coal gas lines, which is to be considered as in addition to the existing generating system. These things should keep Mr. Learned fairly busy during the spring and summer season of 1901, but as hard work has not stopped him so far, it is not likely the named engagements will interfere with his usual placidness. Judging from this recital of what is going on in Meriden gas circles one cannot fail to reach the conclusion that much in our line is doing there !

At the last annual meeting of the Equitable Gas Light Company, of San Francisco, Cal., according to the mention thereof in the San Francisco *Chronicle*, the following results were attained : "The reports submitted at the 3d annual meeting of the Equitable Gas Light Company were of special interest, for the reason that during the twelvemonth an entire new water gas making apparatus was installed at its works, and the two former apparatuses were converted into water gas making machines, giving producing machines in triplicate with a capacity of 1,200,000 cubic feet a day. This involved the change to the open tip burner and an advance in the price of the gas from 65 cents to $1 per 1,000 cubic feet. From Vice-President Blum's statement it appeared that the new policy has been most satisfactory, for while the profits of the year were in excess of $46,400, very nearly $42,000 of this amount was earned during the last 7 months, with almost uninterrupted increase. The number of consumers has grown from 1,202 to 2,442, and the value of the gas sold from $7,475 in February of last year to $19,112 in January of the present year. During the 12 months about 2¼ miles of mains have been laid, consisting of 2,100 feet of 2-inch, 350 feet of 3-inch, 7,400 feet of 4-inch and 1,800 feet of 6-inch mains. The financial statement showed liabilities of $323,383.10, with a balance in favor of the assets of $305,509.73. The profits for the year at the gas works were $69,159.93, with administration expenses amounting to $22,720.85, making the profit for the year $46,439.08. From this amount losses on business for the two preceding years have been deducted, amounting to $11,617.60, leaving the net profits $34,821.48. The Board of Directors and officers were elected as follows : President, Charles L. Ackerman ; Vice-President, Leon Blum ; Treasurer, Frank Pauson ; Secretary, S. H. Tacy ; F. C. Siebe, Joseph Naphthaly and Albert Cerf, with D. Friedrenrich, Attorney.

The Messrs. Street, of New York city, who control the properties of the Peoples Gas and Electric Company, of Oswego, N. Y., have decided to add considerably to the gas main system of that plant. It is also understood that a reduction in the selling rate has been virtually agreed upon, the schedule to be announced early this month.

The application of the Newburyport (Mass.) Gas and Electric Company, for the right to supply gas and electric currents in and to the adjoining towns of Newbury and West Newbury, is under consideration by the State Legislature.

The New York syndicate that has secured control of the Springfield (Mass.) Gas Light Company announces that minority shareholders will have the right to obtain for their holdings the price paid per share for control ($185), provided such right is exercised before April 1st.

(*Concluded on page* 334.)

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

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ELBERT P. CALLENDER,
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CHAS. E. SANDERSON,
MANAGER.

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AGENTS:

New York—American News Co. 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, MARCH 4, 1901.

(*Continued from page* 333.)

THE future rate per 1,000 cubic feet, to the authorities of Baltimore, for the gas used in the public street lamps of that city, has been fixed at 89½ cents. The existing rate is $1 per 1.000. The city lights, extinguishes and makes ordinary repairs.

AT the annual meeting of the Citizens Gas Light and Fuel Company, of Taylorville, Ills., the old Board of officers was re-elected.

THE payment made by the Peoples Gas Light and Coke Company, of Chicago, on account of the operation of its franchise tax (3½ per cent. on its gross receipts), for the last quarter of 1900, amounted to $61,589.01.

THE gentlemen in control of the fortunes of the Troy (N. Y.) Gas Company are considering the advisability of reducing the selling rates. It looks that such a move might be a wise one.

THE Paterson and Passaic (N. J.) Gas and Electric Company proposes to extend it mains to and through the Lakeview and Stony Road sections of its territory.

SUPT. PETTIBONE, of the municipal gas plant at Westfield, Mass., reports a profit for the year (ended February 1st) of $9,233 on operating account, after the sum of $4,000 had been charged to the decrease account for purchase. He admits, however, that the service would be improved were another "lift" put on the gasholder, were good additions made to the generating plant, and many enlargements and extensions made on the distributing system.

THE American Bridge Company is under contract to Messrs. Cooper & Wigand to furnish about 2,800 tons of structural steel for the Kingsbridge Road power house, Third Avenue Railroad, New York city.

THE authorities of Guthrie, Oklahoma Territory, have granted to Mr. J. A. Jones, of Chicago, a franchise for the construction and maintenance of a gas works. Under the agreement the maximum rate that may be charged is $1.50 per 1,000 cubic feet. The grantee also agrees to furnish gas free to the public buildings of the city.

THE application of Messrs. John C. Dutton and N. R. English for the right to operate a gas works in Holland, Mich., has been rejected.

MESSRS. E. G. COWDERY and associates have applied for the right to operate a gas works in Wauwatosa, Wis. This place is on the Chicago, Milwaukee & St. Paul Railroad, at a point about 5 miles west of Milwaukee. It is quite a lively center, and the population of the township (similarly named) is well over 6,000.

A CORRESPONDENT forwards the following clipping: "The chimes of St. Patrick's Cathedral, New York city, consist of 19 bells, ranging in weight from 270 to 6,000 pounds, and having a musical range from lower "C" to upper "D," with the accompanying sharps and flats. For the ringing of these bells the plan decided upon comprises a keyboard about 18 inches long, fashioned like that of a typewriter, to be placed in the sacristy: This may be operated with ease by anyone having a knowledge of music. In addition there is an automatic clock mechanism which is to render the "Angelus" and the "De Profundis" four times daily. In adapting the switch signal system to bell ringing, 19 bell engines, corresponding to the number of bells, were constructed. These bell engines are bolted to wooden seats, which in turn are bolted on a system of steel beams inserted in the walls of the north tower. These engines consist in their working parts of a fine grade of bronze composition metal, so as not to rust or corrode. The engines practically consist of three main parts, two cylinders and a piston, which is fitted to a clip hung on the clapper of the bell above it. On the engine there is an adjustable clevis, so that the stroke can be arranged to a nicety, and once so adjusted it cannot change its position. The engines are operated from the sacristy by means of a keyboard. A key being depressed, a current of electricity is sent along its wire to the belfry, where, by means of an air valve operated through an electro magnet, the compressed air is admitted to the ball engine, and the air pressure delivers the blow, which acts upon the clapper and rings the bell.

THE Directors of the Troy (N. Y.) Gas Company have declared a quarterly dividend of 2 per cent.

AT the annual meeting of the Newton and Watertown (Mass.) Gas Light Company, the retiring board of officers was re-elected.

THE capital stock of the River Shore Gas Company, of Riverton, N. J., has been increased to $140,000.

The Market for Gas Securities.

Strength ruled throughout the city gas share market all the week, with rather positive indications at the close that the hardening in values was due to some important step shortly to be taken. Those outside the Stillman-Sloan-Rockefeller inner circle are strongly prone to the idea that the next move in the gas and electric supply of Greater New York will be the taking over by the Consolidated of the Kings County Electric Company and the Brooklyn Union Gas Company on a leasehold basis, if not through actual purchase. Consolidated opened to-day (Friday) at 192, ex div. of 2 per cent., and closed at 194½ to 195. The nominal figures for Mutual are 294 to 296, and no change is reported in the bid prices for Standards as against those of a week ago. New Consolidated stock, to the extent of $900,000, was listed on the Exchange recently, which brings the total amount outstanding to $73,177,000.

Brooklyn Union is greedily absorbed at anything under 190, when an honest sale's offer is made. Peoples of Chicago, is cheap at the market price. Baltimore Consolidated is in good demand at a shade under 60. Fort Wayne bonds do not seem to be in much favor. Washington (D. C.) gas is eagerly sought for in the neighborhood of 300.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

MARCH 4.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	194⅛	195
Central Union, Bonds, 5's.	3,000,000	1,000	108½	109½
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	120	..
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	294	296
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co.. Bonds, 5's	11,000,000	1,000	108¼	109
Northern Union, Bonds, 5's.	1,250,000	1,000	104	104¼
New York and East River.. Bonds 1st 5's	3,500,000	1,000	103	106⅜
" 1st Con. 5's	1,500,000	..	115	.
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	130	132
Preferred	5,000,000	100	148	150
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	114
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	186	189
" " Bonds (5's)	15 000,000	1,000	118	119
Bay State	50,000,000	50	⅞	1
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works...	450,000	100	22	24
" 1st Mtg. 5's	503,000	1,000	96½	99½
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	7	10
" " Bonds, 5's	5,250,000	1,000	68	71
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Central San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati G. & C. Co.	8,500,000	100	194	198
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	106	107
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	60	65
Preferred	3,026,500	100	84	86
Consumers, Jersey City Bonds	600,000	1,000	102	103

Consumers, Toronto	1,700,000	50	215	216
Consolidated, Baltimore	11,000,000	100	59¼	60
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	12	16
" Con. Mtg. 5's	380,000	1,000	80	85
Consolidated G. & E. Co.'s, Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,560,000	50	88	89
" Prior Lien 5's	4,737,000	1,000	99½	100
Detroit Gas Co., 5's	381,000	1,000	100	101
" Inc. 5's	16,000	100	94	94½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	35	40
Fort Wayne	2,000,000	..	35	41
" Bonds	2,000,000	..	55	.
Grand Rapids Gas Lt. Co.	1,000,000	50	103	105
" 1st Mtg. 5's	1,225,000	1,000	..	..
Hartford	750,000	25	240	250
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	45	55
" Bonds, 6's	2 650,000	..	94⅞	96
Jackson Gas Co	250,000	50	70	75
" 1st Mtg. 5's	265,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	101⅛	103
Laclede, St. Louis	8,271,000	100	73½	75
Preferred	2,500,000	100	98	100
Bonds	10,000,000	1,000	108⅛	109
Lafayette Gas Co., Ind.	1,000,000	100	.	.
Bonds	1,000,000	1,000	56	59
Louisville	2,570,000	50	110	120
Madison Gas & Elec. Co.	400,000	100	63	65
" 1st Mtg. 6's	350,000	1,000	102½	108
" 6 per cent. scrip, due 1901	100,000	25	87	89
Montreal, Canada	2,000,000	100	182	184¾
Newark, N. J., Con. Gas Co	6,000,000	..	..	55
Bonds, 6's	4,600,000	.	..	103
New Haven	1,000,000	25	280	300
Nashville Gas Lt. Co.	1,000,000	50	110	..
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	101¾	101⅞
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	105
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	47¼	47½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	82	85
Extension, 6's	600,000	1,000	..	..
General Mortgage, 5's	2,465,000	1,000	88	90¼
St. Joseph Gas Co	1,000,000	100	35	40
" 1st Mtg. 5's	750,000	1,000	96½	98
Syracuse, N. Y.	1,750,000	100	13¼	14¼
Bonds	1,612 000	1,000	88½	93
Washington, D. C	2,600,000	20	307½	312½
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	100	93¾	95
Bonds, 5's	3,830,500	..	106¼	107½
Wilmington, Del.	600,000	50	200	201

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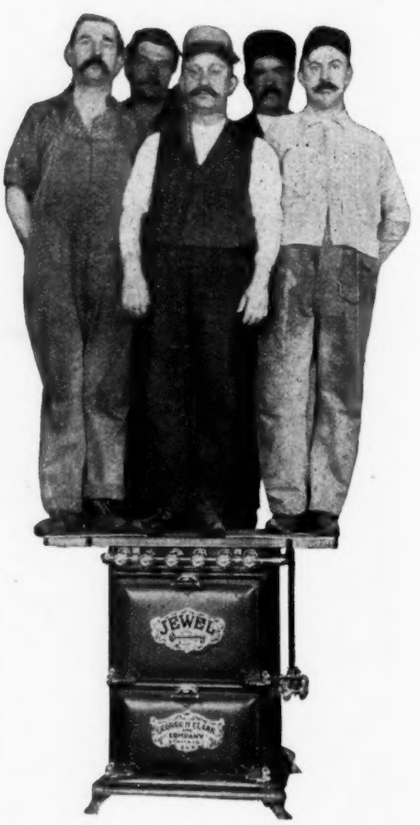

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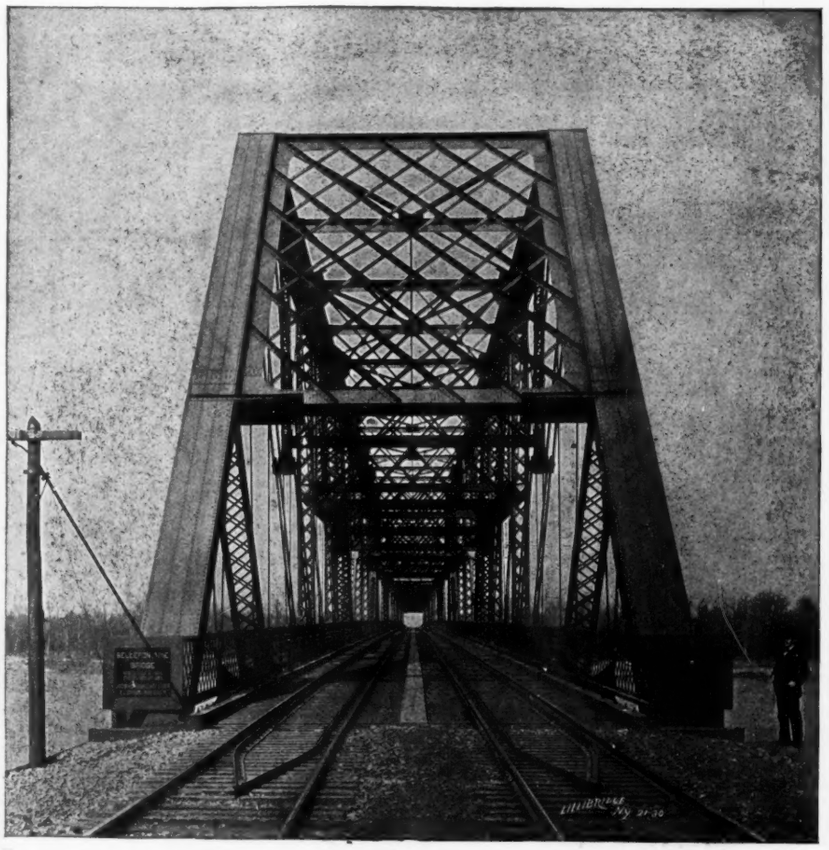

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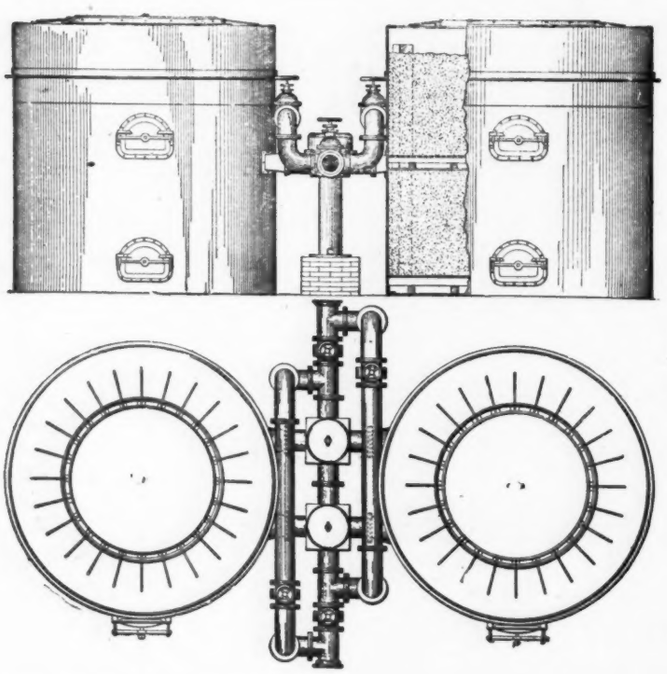

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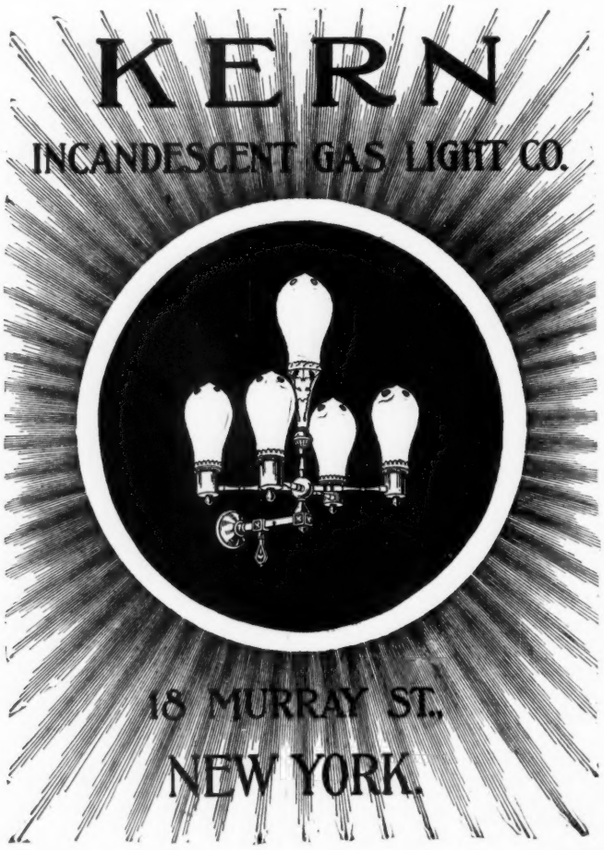

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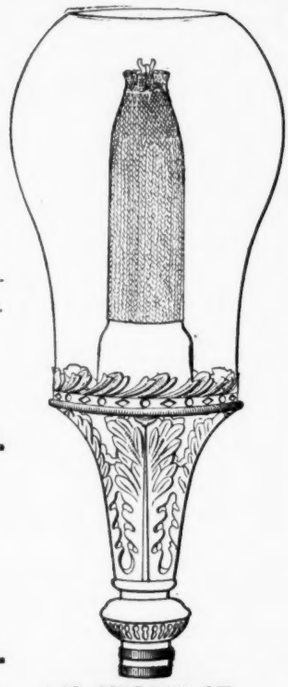

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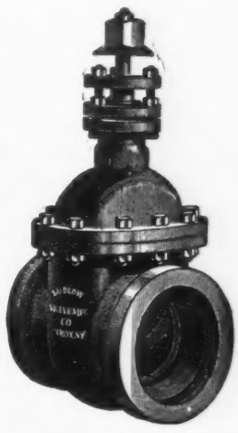

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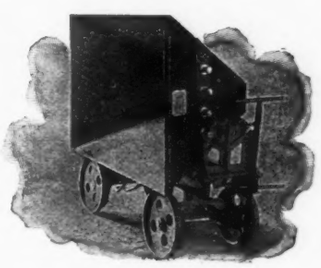

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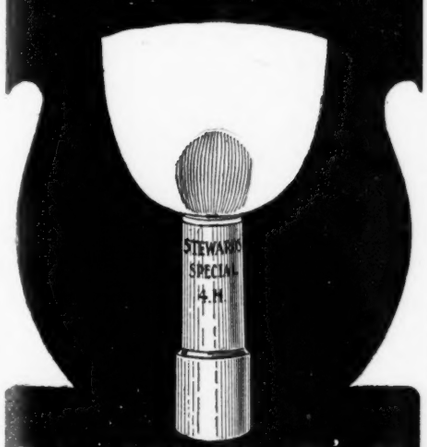

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NEW GAS GOVERNOR AND STEAM VALVE.

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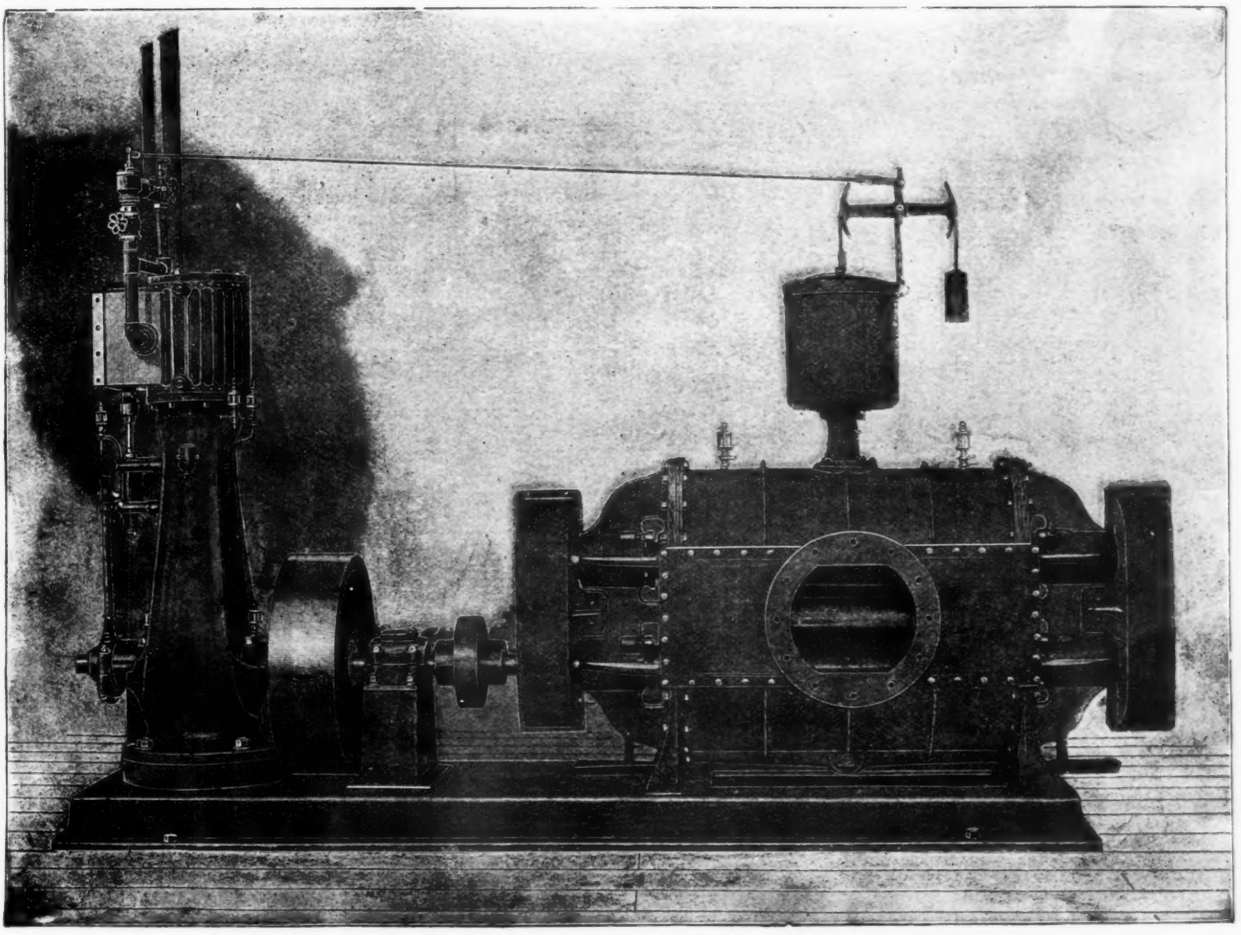

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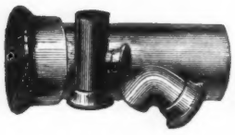

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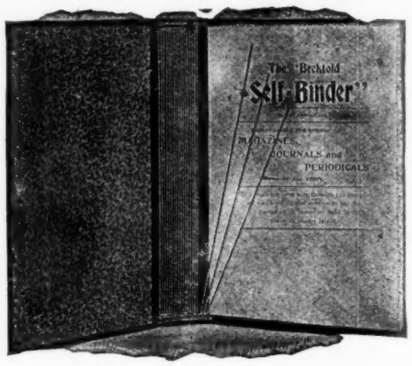

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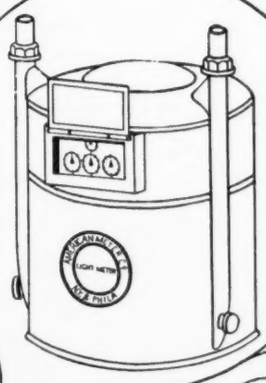

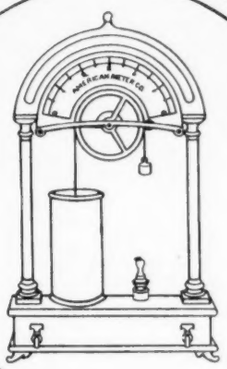

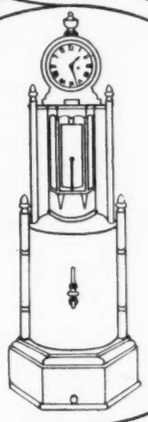

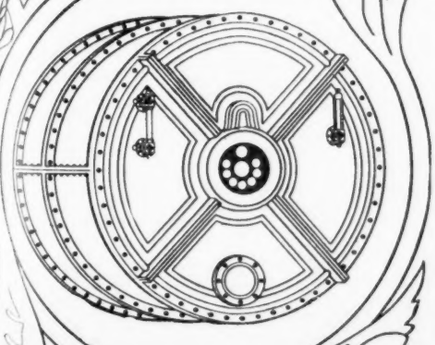

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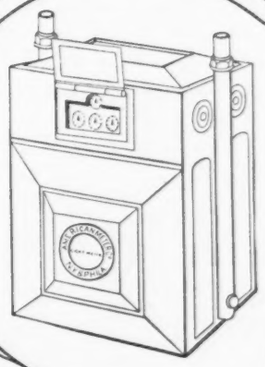
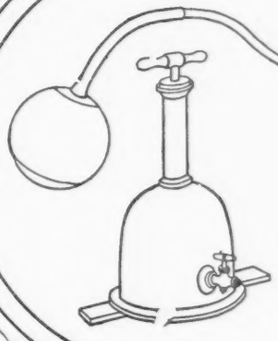
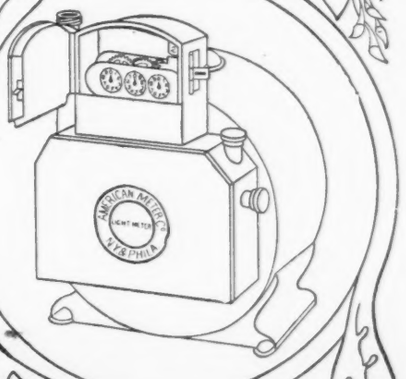






PUBLIC LIGHTING TABLE.

MARCH, 1901.

Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Fri.	1	3.40 AM	5.40 AM	5.30	5.45
Sat.	2	4.20	5.40	5.30	5.45
Sun.	3	No L.	No L.	5.30	5.45
Mon.	4	No L. FM	No L.	5.30	5.45
Tue.	5	No L.	No L.	5.40	5.35
Wed.	6	6.30 PM	8.30 PM	5.40	5.35
Thu.	7	6.30	9.30	5.40	5.35
Fri.	8	6.30	10.30	5.40	5.35
Sat.	9	6.30	11.20	5.40	5.35
Sun.	10	6.30	12.20 AM	5.40	5.35
Mon.	11	6.30	1.10	5.40	5.35
Tue.	12	6.30	2.00	5.50	5.20
Wed.	13	6.30 LQ	2.50	5.50	5.20
Thu.	14	6 30	3.40	5.50	5.20
Fri.	15	6.30	4.20	5.50	5.20
Sat.	16	6.30	5.00	5.50	5 20
Sun.	17	6.40	5.00	5.50	5.20
Mon.	18	6.40	5.00	5.50	5.20
Tue.	19	4.40	5.00	6.00	5.10
Wed.	20	6.40 NM	5.00	6.00	5.10
Thu.	21	6.40	5.00	6.00	5.10
Fri.	22	6.40	5.00	6.00	5.10
Sat.	23	6.40	5.00	6.00	5.10
Sun.	24	6.50	4.50	6.00	5.10
Mon.	25	11.30	4.50	6.00	5.10
Tue.	26	12.20 AM FQ	4.50	6.10	4.55
Wed.	27	1.10	4.50	6.10	4.55
Thu.	28	1.40	4.50	6.10	4.55
Fri.	29	2.20	4.50	6.10	4.55
Sat.	30	2.50	4.50	6.10	4.55
Sun.	31	3.20	4.50	6.10	4.55

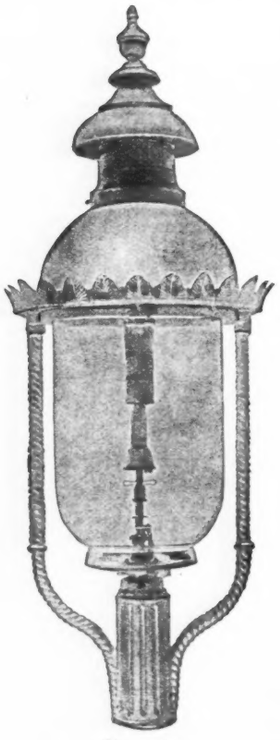
TOTAL HOURS LIGHTING DURING 1901.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	220.10	January	423.20
February	192.30	February	355.25
March	180.00	March	355.35
April	158.30	April	298.50
May	140.40	May	264.50
June	135.40	June	234.25
July	138.00	July	243.45
August	156.20	August	280.25
September	174.40	September	321.15
October	202.30	October	374.30
November	220.40	November	401.40
December	241.30	December	433.45
Total, yr.	2161.10	Total, yr.	3987.45

NEW YORK, 33 Nassau St. PHILADELPHIA, Broad and Arch Sts. CHICAGO, 54 Lake St.

Welsbach Street Lighting Company

.... OF AMERICA ....



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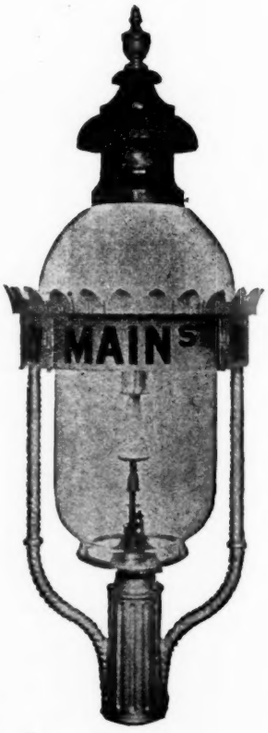
Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.



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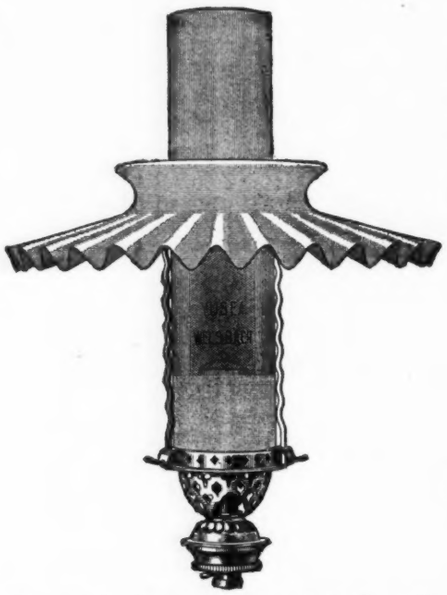

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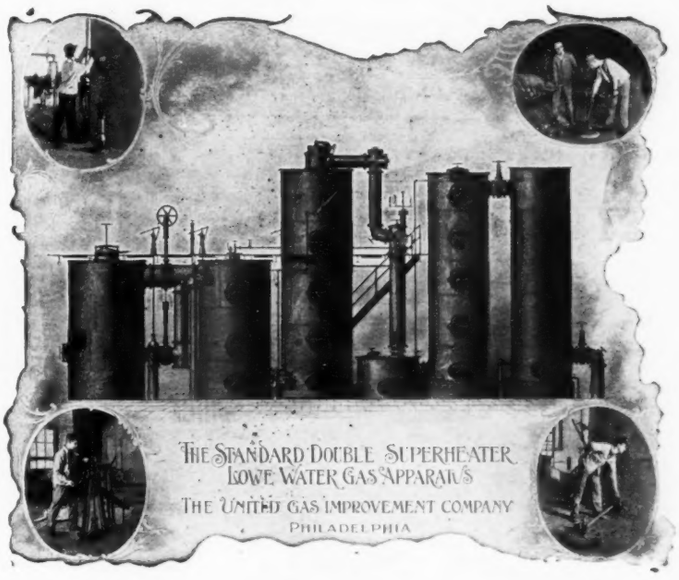
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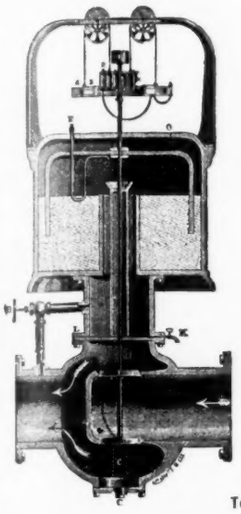

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FOR GAS PURIFICATION.

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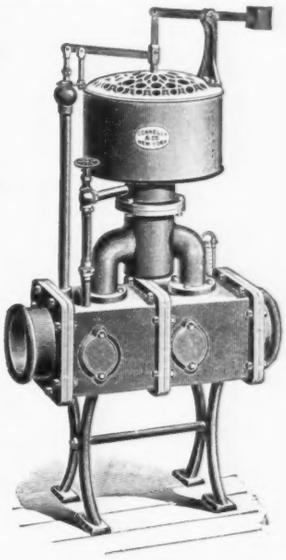

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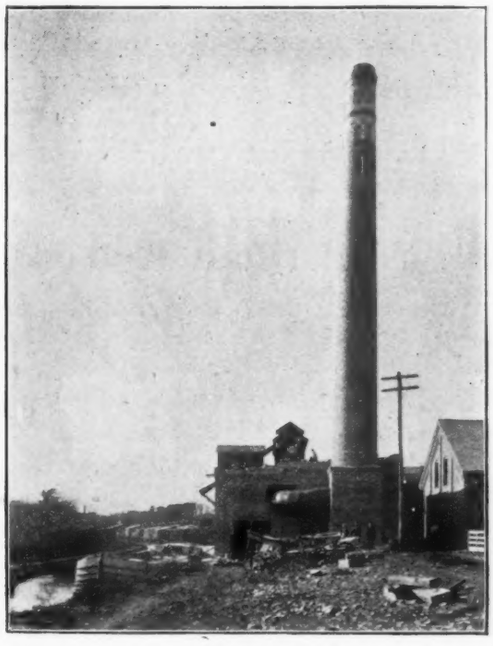

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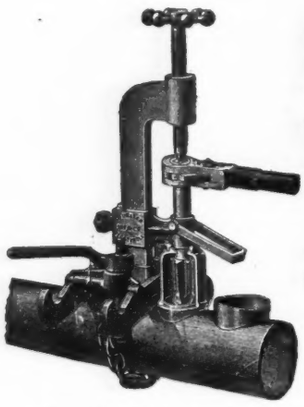

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The Pioneer Vertical Water Tube Boiler of the World.

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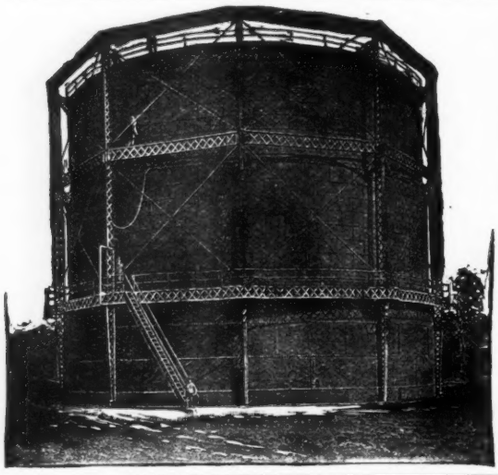

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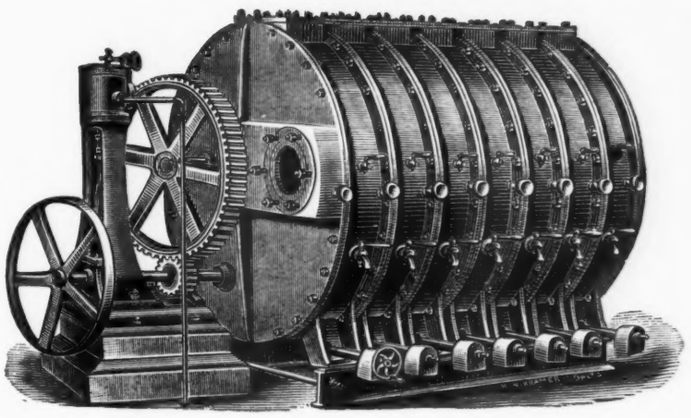

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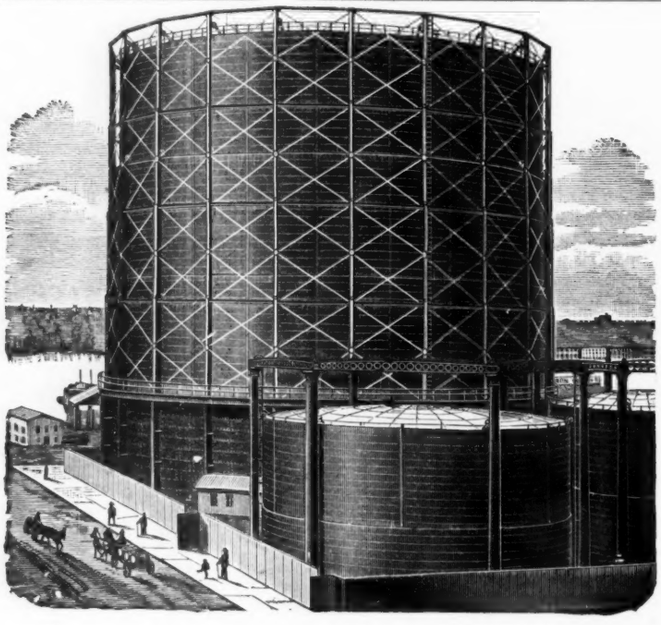

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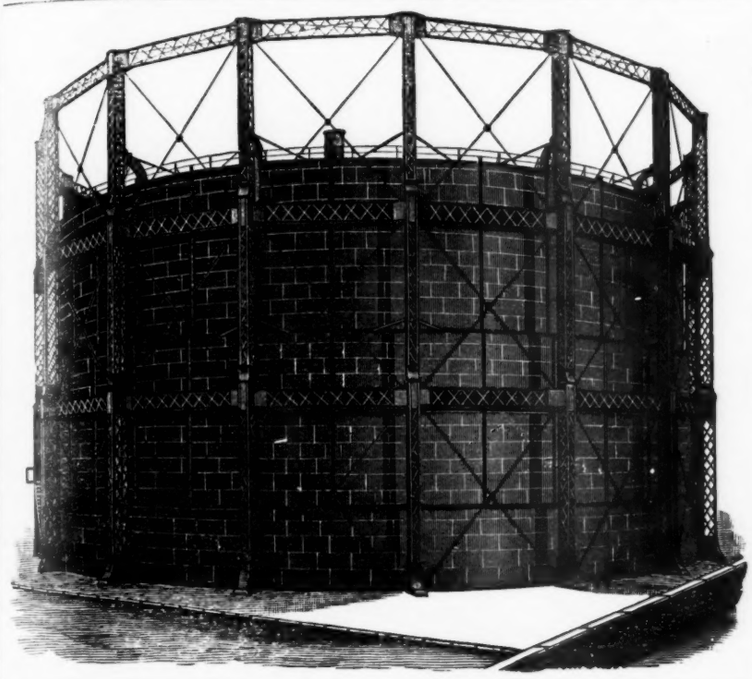

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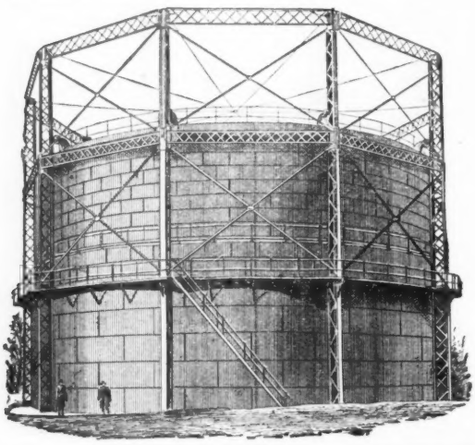

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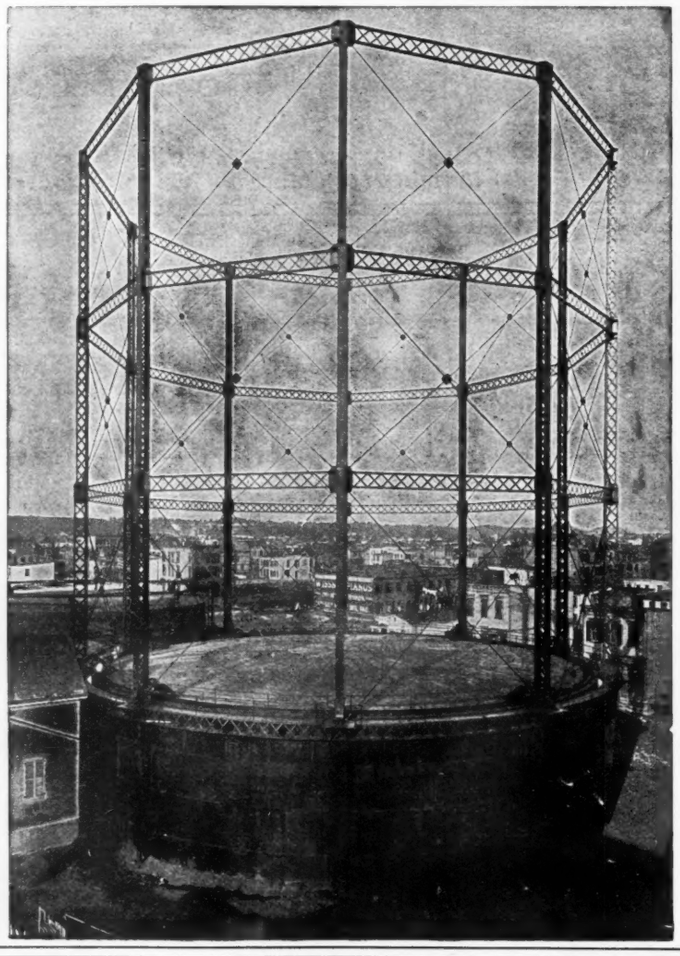

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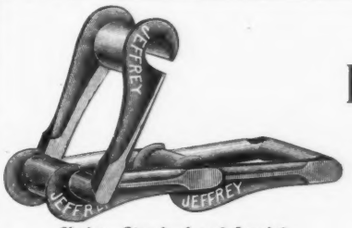

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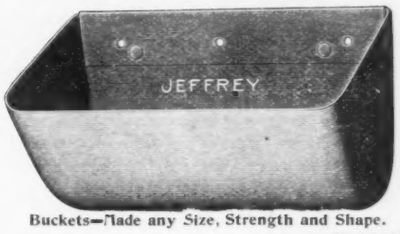

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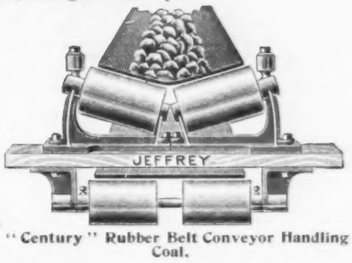

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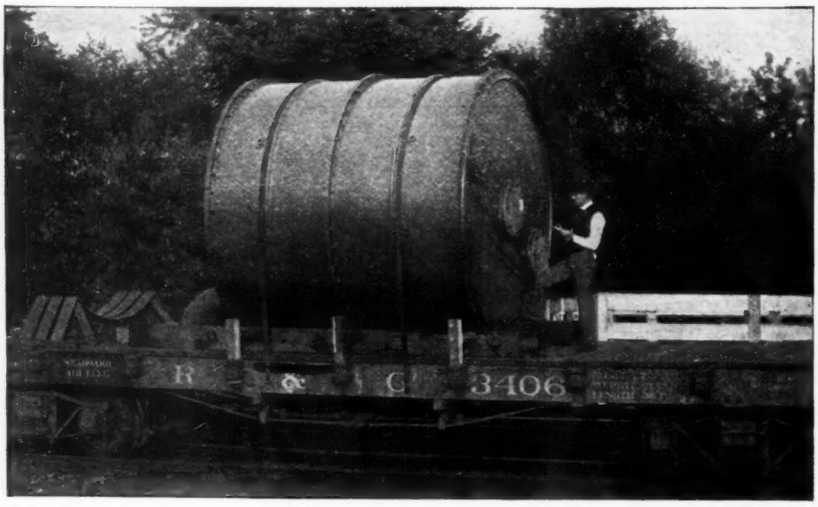

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